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THE SULPHUR POSITION

SULPHURIC acid is used to a remarkable extent in most modern industries, and sulphur is one of the most important raw materials for industry. The gas industry is directly concerned with the sulphur position and will find of great interest and value a D.S.I.R. survey on the subject published last week by H.M. Stationery Office. In addition to providing in small compass a clear and comprehensive summary of the situation the survey should serve to correct the misapprehension current in many quarters that little or nothing has been done in this country to conserve supplies of sulphur, to utilise sources of sulphur other than elemental sulphur, or to recover sulphur from waste gases. It is probable that as much has been done on these lines in this country as anywhere else in the world and that wider application of the work has been limited only by economic factors.

The United Kingdom supplies of crude sulphur come almost exclusively from the United States. In 1950 we imported 439,000 tons from the United States and only 357 tons from other countries. This, as the survey emphasises, is not only expensive in dollars but it renders us unduly dependent on a single source of supply. Three-quarters of the imports were used for sulphuric acid manufacture and the remainder as a raw material for other chemical processes. The price of sulphur has not kept pace with the general rise in raw material prices, including pyrites, and it has not reflected the scarcity of diminishing supplies. 'Manufacturers have therefore had little incentive to use or investigate processes using other sulphur-containing raw materials or to apply measures of sulphur economy and recovery.' The sulphuric acid capacity of the United Kingdom has increased from just over 1 mill. tons in 1938 to nearly 2 mill. tons in 1950. The consumption of acid in 1951 was about 1.8 mill. tons. In 1938, 22% of our acid was made from sulphur and 38% from pyrites. In 1950, 56% of our acid was made from sulphur and 17% from pyrites. While our acid production has nearly doubled in the last 12 years, our consumption of sulphur for acid has increased nearly five times.

Anhydrite (calcium sulphate) is the only important indigenous raw material for sulphuric acid production. Very extensive deposits exist at Billingham and in Cumberland and Furness. The Billingham deposits extend probably as far as Nottingham, so that an adequate supply of raw material is assured. The process for the manufacture of sulphuric acid consists in the controlled reduction of calcium sulphate with coke to calcium sulphide, which reacts with more calcium sulphate, the sulphur dioxide evolved being converted by the usual methods to sulphuric acid. Clay and sand are added to the roast and a portland cement clinker is produced as a by-product. Only an adequate market for the cement makes this process an economic possibility. In the United Kingdom, the plant for sulphuric acid from anhydrite is in production at Billingham and the present capacity of 100,000 tons of acid per annum is to be extended by 73,500 tons. Recently a new company, the United Sulphuric Acid Corporation, has been formed by 11 British firms, including I.C.I., Ltd., Courtaulds, Ltd., British Enka Co., and the Clayton Aniline Co., which plans to erect a plant, probably on Merseyside, for the production of 150,000 tons per annum of sulphuric acid from anhydrite. It will be some years before the plant will come into operation. Some 600,000 tons of the present production of 900,000 tons of ammonium sulphate in the United Kingdom is made from anhydrite by double decomposition with ammonium carbonate from synthetic ammonia. The remainder of the ammonium sulphate comes from the by-product ammonia from gasworks and coke ovens where sulphuric acid is used to combine with the ammonia.

A potential supply of some 99,000 tons of sulphur a year is available from coke ovens. Sulphur is not at present removed from coke oven gas except that which is sold as town gas, but about 20,000 tons of sulphur could be recovered from the 10 largest coke ovens, and a programme for the installation of iron oxide boxes or other recovery equipment is under consideration. The National Coal Board intends to practise sulphur

recovery on a wider scale in all its new coke oven installations. At Nantgarw and at Avenue, near Chesterfield, which will be the largest coking plant in Europe, sulphur recovery by the iron oxide process will be on a considerable scale. In the present year world production of sulphur is 1 mill. tons short of requirements and by 1953 the shortage, because of increasing demand, is expected to be about 2 mill. tons. Even with new supplies it would seem that the world position, at least in the immediate future, will worsen. The D.S.I.R. survey maintains that the United Kingdom should therefore not relax its efforts to recover as much sulphur as possible from indigenous sources—anhydrite and coal—and to widen the basis of its supplies of sulphur and sulphuric acid from pyrites and oil. The possibility of doing this economically will, of course, depend to a large extent on the policy which the United States adopts on the price of sulphur.

Consideration is given in the survey to the possible methods of conserving sulphuric acid and thus economising in the use of sulphur. The gas and coking industries consume some 200,000 tons of 100% sulphuric acid per annum for the neutralisation of ammoniacal liquors. In this way 300,000 tons of ammonium sulphate is produced (gas industry 90,000 tons, coke ovens 210,000 tons). The use of gas liquor as a fertiliser—a subject dealt with in the *Gas Journal* of January 23 last—is one way of effecting economy in the use of sulphur. Then, of course, there are various other suggestions for using ammoniacal liquors, including concentration, purification, and subsequent oxidation to nitric acid; conversion to ammonium sulphate by calcium sulphate double decomposition; washing of power station flue gases; combination with sulphur dioxide in flue gases to produce ammonium sulphate (Lessing process); conversion to ammonium bicarbonate; precipitation of iron oxide from copperas to replace bog ore, with recovery of ammonium sulphate. The survey regards the economics of these processes as 'very doubtful,' with the exception that, if flue gases and ammonia are both available on site the Lessing process is likely to be economic.

'DISCRIMINATION'

PROTESTS from gas consultative councils alleging coal price discrimination prejudicial to the gas industry have elicited from Mr. R. N. Quirk (Under-Secretary, Gas) on behalf of the Minister of Fuel and Power a statement that, although the Ministry was consulted about the general principles underlying the new price structure before it was introduced, this did not detract from the responsibility conferred on the National Coal Board by the 1946 Act for 'making supplies of coal available, of such qualities and sizes, in such quantities and at such prices, as may seem to it best calculated to further the public interest in all respects, including the avoidance of any undue or unreasonable preference or advantage.' Various drafts of the price proposals were discussed in 1951 by the Industrial Coal Consumers Council, whose Chairman, Sir Ernest Smith, last month told the British Coking Industry Association and the Low Temperature Coal Distillers' Association that the Council accepts the Coal Board's explanation that although individual coals carry different prices when supplied for carbonisation than the same coals realise under the domestic zone price scheme there is no intention on the part of the N.C.B. to reduce the price of domestic coal at the expense of industry as a matter of policy. On the contrary, says Sir Ernest, it is expected that the re-arrangement of prices will help the re-allocation of coals, as opportunities arise, to the markets for which they are best suited. Sir Ernest's statement does not allude specifically to gas but it refers to 'strongly divergent views' among the interests consulted and asserts that the Coal Board modified its proposals to meet to some extent the claims of the carbonisation industries—so much so that in the opinion of the Industrial Coal Consumers' Council the Board has not accorded undue or unreasonable preference or advantage to domestic or industrial consumers at the expense of the carbonisation industries.

As gas consumers we sympathise with those members of the South Eastern Gas Consultative Council who at last week's meeting expressed disappointment at a letter which appeared to them to 'dodge the issue' and decided to obtain as much information as possible on the subject from the officers of the Gas Board with a view to renewing their protest to the Minister. The whole matter has been well ventilated and although the gas industry is not mentioned either in the Under-Secretary's letter or in Sir Ernest Smith's statement we have no doubt that the Gas Council—several of whose members in their capacity as area board chairmen have spoken with great candour to their respective consultative councils—has made its feelings known in the proper quarter. For those reasons we have our doubts as to whether continued agitation on the part of one, or perhaps more than one, gas consultative council will yield any tangible or direct results. But if it does nothing else it will at least help to keep before the attention of the Minister—and perhaps of those Members of Parliament who in recent utterances have shown themselves eager for the solution of the problems involved—the need for a properly co-ordinated policy in which all sections of the fuel and power industries may work together for the common good of the consumer.

PROGRESSIVE OUTLOOK

DR. HAROLD HARTLEY'S speech at the annual general meeting of Radiation Ltd. last Thursday was a tonic for these difficult times. The outlook, he confessed, is not bright, but where there are difficulties they must be overcome, and with an optimism well founded on his own long technical and administrative experience he added: 'The Company has an important part to play in assisting the well-being of the industries with which it is connected, and the Board intends that part shall be played.' Despite the shortage of materials the output of products, as well as their monetary value, increased last year; in some spheres there was an appreciable increase in output and the financial value of the turnover showed an overall

increase of 9%. The success of that side of the gas industry that remains under private enterprise, however, is not to be measured by turnover alone, but by the service it renders to the supply side, the nationalised side, of the gas industry, and ultimately to the consumer.

Such service falls mainly under the headings of research and development, costs and prices, and group sales. Radiation has been a pioneer in research from its inception, and last year the research and development section benefited from organisational changes introduced in 1950. Thought has been given to the possibility of increasing the flexibility of appliances so that satisfactory performance may be attained even if appreciable changes in gas quality have to be made. Work on problems arising out of the supply industry's difficulties in maintaining supplies of gaseous fuel has been increased; the combustion laboratory has been re-equipped and re-organised, and a new laboratory has been installed at Wembley for use in that connection. Dr. Hartley attributed a national shortage of competent young men with a scientific training partly to the counter-attraction of Governments and industry generally, and partly to the fascination of nuclear research, and deplored a lack of appreciation of the opportunities offered by well-established industries with a progressive outlook.

A year ago Dr. Hartley drew attention to a reduction of 12½% in the price of the Low Price cooker. Further monetary inflation has occurred since that time and all costs have risen sharply. As it was no longer possible to expand output so as to counteract the effect of rising costs it was decided regretfully as from October 1 that an increase in price would have to be made. Had the Board given less consideration to national needs prices would have risen earlier, and such an increase would have been accepted by customers as justified. The home market demand for domestic appliances exceeds the quantity that can be manufactured with the materials available. The demand for large cooking equipment is also in excess of output. A 10% increase in exports in 1950 was followed by a 30% increase last year, while for the December quarter export deliveries were running at 50% above the corresponding period of 1950.

Dr. Hartley came to last Thursday's meeting with his tour of Australia and New Zealand still fresh in his memory—a tour designed to co-ordinate the Group's activities in each of the Dominions and to assure that the trade of the Group should be less influenced by changes imposed owing to economic difficulties experienced either here or abroad. He was impressed with the high position of Radiation products in the esteem of the people of Australasia and the appreciation in the Dominions of the part played by the organisation in helping in the expansion of the gas industry in the sphere of utilisation and of the good effects of the Group's policy of specialisation in production.

An adjustment of the capital structure has increased the stability and also the credit of the Group, since accumulated reserves which have been capitalised can no longer be regarded as distributable income. The primary object of the operation was to bring issued capital into closer relationship with the amount employed in the undertaking. Of a total of £259,084 capital expenditure on new buildings and plant, a portion is represented by expenditure of the New Zealand subsidiary, the direction in which development is to take place having been planned in broad outline. Manufacture at home and abroad is to be adjusted so as to promote the best interests of the Group as a whole. It only remains to record Dr. Hartley's reference to the transfer of the head offices from Birmingham to London and his well-earned tribute to the degree of co-operation which exists throughout the organisation and the spirit which animates relations with different sections of the Group. Successes such as those revealed throughout the report and accounts would be impossible without the cordial relations which exist between all sections of the organisation and every individual within those sections.

PUTTING THEM WISE

THE great proportion of members of consultative councils are, we suppose, just ordinary folk—by which we mean they are, or were until they joined their council, unfamiliar with the everyday problems surrounding the operations of a gas undertaking. Even after a period of service on a gas consultative council a member cannot be expected to understand fully all the problems of the board which come before him in the exercise of his duty as the representative of the consumer. We therefore commend the policy adopted in the North Thames and certain other areas of inviting senior officers of the board to talk to the members about the inner workings of their departments. Several senior officers on the North Thames headquarters staff have addressed the Council during the past 12 months or so; and as a result the members have had the opportunity of learning a great deal about the gas industry, its day-to-day problems, and its service to the community—all of which is, of course, a very useful facet of 'public relations.'

It was on this subject that the North Thames Consultative Council was addressed at its last meeting by Mr. L. H. Hardern, the Board's Public Relations Officer, who explained how, in normal times, his department would spend some £100,000 a year on its many phases of public relations, advertising, publicity, exhibitions, and displays, films, and information services. For the duration of the present 'go slow' on advertising and publicity, the Board is not, of course, spending this figure, but it is—to use a current industrial term—fully 'tooled up' to swing into full operation as soon as times become more normal once again. In the meantime, the Public Relations Department is operating a skeleton service which provides all the essential publicity required to keep gas before the public eye in the London area.

APPEAL TRIBUNAL FOR CONSUMERS?

'FAILURE of consultative councils to provide satisfactory protection for the interest of consumers, due in some measure to the fact that they appear to be dependent on the officers of their boards for technical and financial advice, points to the need for an effective appeal tribunal for the gas and electricity industries.' Such was the argument advanced by Councillor A. T. Edmonds (Mayor of Winchester) in moving a resolution at the annual meet-

ing of the Association of Municipal Corporations in London asking the Government to introduce legislation setting up a tribunal to approve tariff increases and to hear appeals on tariffs and terms of supply. A further objection to the present set up of consultative councils is, in Councillor Edmonds' opinion, the fact that their chairmen are members of the boards and that secretaries are employed for most of thier time in the boards' offices. Councillor Edmonds thinks the existence of an effective tribunal would have a salutary effect on boards in making tariff proposals and would provide consumers with reasonable protection. The resolution was approved by a large majority and referred to the executive council of the Association. Incidentally, the Association has under consideration a request to the Government to return to the local authorities the distribution, if not the manufacture, of gas and electricity.

We have heard it argued that the consultative councils, in their present form, are an inadequate protection for the consumer on financial matters, on which they appear to have little option but to rubber stamp their boards' proposals. But would an appeal tribunal provide any better protection? The board of a nationalised industry does not raise its tariffs just for the fun of the thing; it does it through sheer necessity—and an appeal tribunal, consisting as it would of experts, would therefore be even quicker to see the necessity of a proposal. The protection the consumer needs lies farther back in the chain—so far back, indeed, that the Government of the day, by its economic policy, can alone provide the complete solution. The existence of any kind of tribunal to which consumers of a nationalised industry can appeal is, however, in principle, a good thing.

Personal

Mr. J. R. W. Alexander, M.A., LL.B., President of the Chartered Institute of Secretaries, became President of the Institute of Arbitrators on March 31, in succession to Colonel F. N. Falkner.

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Mr. B. P. Bezant, Engineer of the Tonbridge Station of the South Eastern Gas Board, in last week's Kent County Council election, held the Tonbridge Urban seat for the Conservative Party.

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Mr. D. E. Baird has been appointed Deputy Chairman of the Durham Divisional Board of the N.C.B. in succession to Mr. R. S. Barrett, retired. Mr. Baird relinquishes the post of Carbonisation Director to the Divisional Board which he has held since the Durham Division was formed in January, 1950. He took up his new post on April 1.

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Councillor J. W. Simpson, District Representative of the South Eastern Gas Board in the Brixton and Herne Hill areas, was unanimously elected Chairman for 1952-53, at the annual general meeting of the Lambeth Chamber of Commerce and Trade on March 27. Councillor Simpson, who was Mayor of Lambeth in 1947-49 is also Chairman of the Lambeth Food Control Committee and Lambeth Industrial Savings Committee.

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Mr. C. L. Ridley has been appointed Northern Area Sales Manager for Graphite Products, Ltd., of Battersea, London, S.W.11. He joined the Company in 1918 and is well known among gas engineers in the north west of England, not only for his work on the development of the 'Foliac' sealer system for purifiers, but also for his ingenuity in solving many jointing and lubrication problems in the gas industry.

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Professor D. T. A. Townend, D.SC., PH.D., D.I.C., HON.M.INST. GAS E., F.INST.F., has been awarded the Melchett Medal of the Institute of Fuel for 1952, in recognition of his outstanding contributions to the science of combustion, particularly in the field of higher hydrocarbons. Dr. Townend is Director General of the British Coal Utilisation Research Association. After serving in the Royal Naval Air Service in the first world war he went to the Imperial College of Science and Technology, where he collaborated with the late Professor W. A. Bone, F.R.S., and Professor D. M. Newitt, F.R.S., in researches on gaseous combustion at high pressures; he held successively a Salter's Research Fellowship and a Rockefeller International Research Fellowship. In 1938 he was appointed Livesey Professor of Coal Gas and Fuel Industries, with Metallurgy, at Leeds University, and early in 1945 he was invited to his present post at a transitional period in the history of B.C.U.R.A. Under his guidance its work has enhanced its scientific reputation. Dr. Townend was President of the Institute of Fuel in 1948-50.

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Mr. A. P. Kelsey, Director of Stoves, Ltd., Rainhill and London, is retiring after 52 years in the gas appliance industry, during which time he has taken a leading part in promoting sales in the south, west, and other areas of England on behalf of both Falk, Stadelmann & Co., Ltd., and Stoves, Ltd. He has received many messages from friends wishing him well in his forthcoming retirement. At a luncheon given by the Directors of Stoves, Ltd., on March 31, a presentation was made and cordial good wishes were expressed for a happy retirement.

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Mr. W. T. Wren has been appointed Assistant Managing Director of Allied Ironfounders, Ltd.

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Mr. R. J. W. Wilson, Mechanical Engineer, has retired after 32 years' service with the Tottenham gas undertaking—29 with the Tottenham and District Gas Company and three with the Eastern Gas Board. He was entertained at dinner by 105 craftsmen from the Willoughby Lane works and was the recipient of a case of pipes, and on the actual day of his retirement other workpeople at Willoughby Lane and the various works on the division, as well as employees at Woodall House and the district offices, joined in the presentation of a cheque which Mr. E. C. Woodall, Chairman of the old Company and now a member of the Eastern Gas Board, handed to Mr. Wilson on their behalf.

Obituary

Mr. Charles L. Sinclair, J.P., for many years Engineer and Works Manager at Kingston-on-Thames both before and after the Kingston Gas Company was acquired by the Wandsworth and District Gas Company in 1930, died on March 30. On nationalisation he undertook public relations work for the Kingston district of the South Eastern Gas Board. He took an active interest in civic affairs and had twice been Mayor of Kingston. Mr. Sinclair had been a member of the Institution of Gas Engineers since 1928.

Diary

April 12.—Scottish Juniors (Eastern): Paper by R. H. Foston (Perth).

April 15.—London and Southern Section, I.G.E.: 'Post-War Developments at the Southall works of the North Thames Gas Board,' D. C. Bertram (Station Engineer, Southall, North Thames). 17, Grosvenor Crescent, S.W. 1, 2.30 p.m.

April 17.—North Thames G.C.C.: Caxton Hall, Westminster, 2.30 p.m.

April 17.—Wales Juniors: Annual General Meeting, Llandrindod Wells. Presidential Address, S. G. Meade; 'Carbonisation Efficiencies,' J. Newman.

April 17-18.—Scottish Association of Gas Managers: First Annual Meeting, Shandon Hydro Hotel, Rhu Helensburgh. (Golf and bowls on April 17; Presidential Address of E. G. Smith, Glasgow, on April 18).

April 18.—Scottish Juniors (Western): Annual General Meeting and election of officers; Royal Technical College, Glasgow.

April 19.—Western Juniors.—Annual General Meeting and Presidential Address. Bristol.

April 22-25.—Women's Gas Federation: Conference on Food, Health, and Hygiene, followed by 17th Annual Meeting, Stratford-on-Avon. (For full programme see *Journal* of February 13, p. 407.)

April 23.—Eastern Juniors: Morning visit to Cambridge gasworks; afternoon visit to Cambridge Instrument Co., Ltd.

April 23.—Institute of Fuel: Annual Corporate Meeting, Institution of Mechanical Engineers, Storey's Gate, S.W.1; 4.30 p.m. Presidential Address of Dr. G. E. Foxwell, 5.30 p.m.

April 24.—Midland Juniors: President's Day. Coventry.

April 24.—Institute of Fuel: Annual Luncheon, Connaught Rooms, W.C.2, 12.30 for 1 p.m.

April 25.—Midland Section, I.G.E.: Annual General Meeting, Birmingham.

April 25.—London and Southern Juniors: Jubilee Celebration Dinner, Caxton Hall.

April 25.—Manchester and District Section, I.G.E.: Annual General Meeting, Grand Hotel, Manchester, preceded by luncheon at 12.30 p.m. for 1 p.m.

GALLANTRY AND MERITORIOUS SERVICE

BRITISH Empire Medals were presented by Mr. Geoffrey Lloyd, Minister of Fuel and Power, acting on behalf of the Queen, at the Ministry on March 28 to 31 New Year recipients of the honour in the fuel and power industries. The presentations included seven of the eight representatives of the gas industry whose names appeared in the New Year Honours, namely:

The gas industry's British Empire Medallists photographed after the presentation. Left to right, back row: J. R. Tozer, H. Carbines, R. C. Floyd, D. J. Harvey, A. Nickolds, Dr. A. B. Badger (Industrial Relations Officer, Gas Council), W. Trafford, W. Edington, G. A. Butty (friend of Mr. Trafford), and A. King. Seated left to right are Mrs. Tozer, Mrs. Carbines, Mrs. Floyd, Mrs. Harvey, Mrs. Courts (daughter of Mr. Nickolds), Mrs. Edington, and Mrs. King.

WILLIAM EDINGTON (62), general foreman, Dalmarnock, Scottish Gas Board; ROBERT C. FLOYD (57), district inspector, Croydon, South Eastern Gas Board; DAVID J. HARVEY (65), senior collector, Finchley, North Thames Gas Board; ARTHUR KING (63), foreman joiner, Cottingham, North Eastern Gas Board; ALBERT NICKOLDS (65), senior carbonising foreman, Coventry, West Midlands Gas Board; JOHN R. TOZER, M.M. (62), works foreman, Torquay, South Western Gas Board; and WILLIAM TRAFFORD (54), foreman main and service layer, Eston, Middlesbrough, Northern Gas Board. The eighth member of the gas industry, who unfortunately could not attend the investiture, was HARRY SMITH (43), works foreman, Nelson, North Western Gas Board.

In addition to these awards, which were mainly for long and meritorious service, the Minister presented two awards for gallantry, one to a representative of the coal industry and the other to HERBERT CARBINES (39), assistant foreman of main layers, Beckton, North Thames Gas Board, whose 'act of outstanding courage and resolution in an emergency' was described in the *Journal* of February 20 (p. 469). One of his labourers, William Lake, received the King's Commendation for Brave Conduct.

GAS LECTURES AT CHELTENHAM

SIX lectures were given at Cheltenham from March 19 to 21 by Miss Lovell Burgess, Lectures Officer to the Gas Council, at the invitation of the Cheltenham division of the South Western Gas Board.

The lecture programme was formulated with the approval of Mr. A. L. Morris, Manager of the Cheltenham sub-division, and included women's organisations, Cheltenham Technical College, and schools.

On March 19 Miss Burgess was the speaker at a meeting of the Women's Gas Federation held at Cheltenham gas showroom. Miss Humphries, Chairman of the National Executive of the Women's Gas Federation, also addressed the meeting.

Gas Council films and film strips were used at several of the meetings and subjects ranged from gas manufacture and by-products to smoke abatement and the domestic use of gas.

Full support was given by divisional officers, including Miss M. Hampson, Senior Home Service Adviser of the Cheltenham sub-division, whose detailed help in arranging the programmes contributed greatly to their success.

Sulphur from Petroleum

PRODUCTION of raw sulphur from petroleum has begun on a commercial scale for the first time in this country at Shell's refinery at Stanlow, Cheshire. The new venture will not only ease the supply position, but also help to save dollars.

The cracking of crude oil fractions always results in the production of some by-product hydrogen sulphide. Accordingly, when a 'cat-cracker' was planned as part of Stanlow refinery's extensions for the processing of Middle East crude oil, it was decided also to install facilities for converting this by-product hydrogen sulphide to elemental sulphur.

Sulphur itself is used only to a limited extent in oil refining, but sulphuric acid, which is generally made from sulphur, is used extensively in the refining of oils and in petro-chemical manufacturing operations. An acid plant is, therefore, to be installed at Stanlow by the end of the year, which, in conjunction with a sludge decomposer to be erected later, will convert waste sulphuric acid to fulfil the refinery's requirements.

Shell's acid requirements will, as far as possible, however, be obtained from outside sources, thus releasing to domestic users the maximum amount of raw sulphur.

Beating Import Cuts

IN a cable from Sydney, Australia, Mr. W. L. James, Chairman of Pegson, Ltd., Coalville, announced the signing of an agreement with Hadfields, of Sydney, one of the most important steel concerns in Australia, to manufacture under licence the complete range of Pegson crushing and screening plant in that country.

Crushing and screening plant built by Pegson, Ltd. (a company of the Mellor Bromley Group) has been employed in many important international hydro-electric and irrigation projects such as the Vaitarna Dam in India, and the Owen Falls scheme in Uganda. The latter scheme now under construction at the source of the White Nile will have the effect of raising the level of Lake Victoria by one metre.

We are informed by Mr. Hannah (a Director of Pegson, Ltd.) that the value of export to Australia in the past few years had grown to such proportions that this new arrangement should release certain production facilities at Coalville for other vital export markets. The recent Australian restrictions on imports have more than proved the far-sightedness of this step.

Imported Machinery

ATTENTION was drawn in the *Journal* of March 19 to the Chancellor of the Exchequer's Budget statement that for the time being the issue of duty-free licences under Section 10 of the Finance Act, 1932, for imports of machinery would be suspended and that no application posted after March 11 would be considered.

Importers are reminded that on December 13, 1949, it was announced that: 'Applicants for duty-free licence should provide evidence of their intention to import by sending to the Board of Trade copies of their order and the supplier's acceptance of the order, or invoice. Importers will be required to certify that the machines are for their own use; or, if they are acting as agents, to produce evidence that they have received firm orders from manufacturers who will use them.'

The Board of Trade therefore announces that an application for a duty-free licence despatched on or before March 11, 1952, by an agent, will not be considered unless the agent had by that date received a firm order from the United Kingdom user for the machine covered by the application.

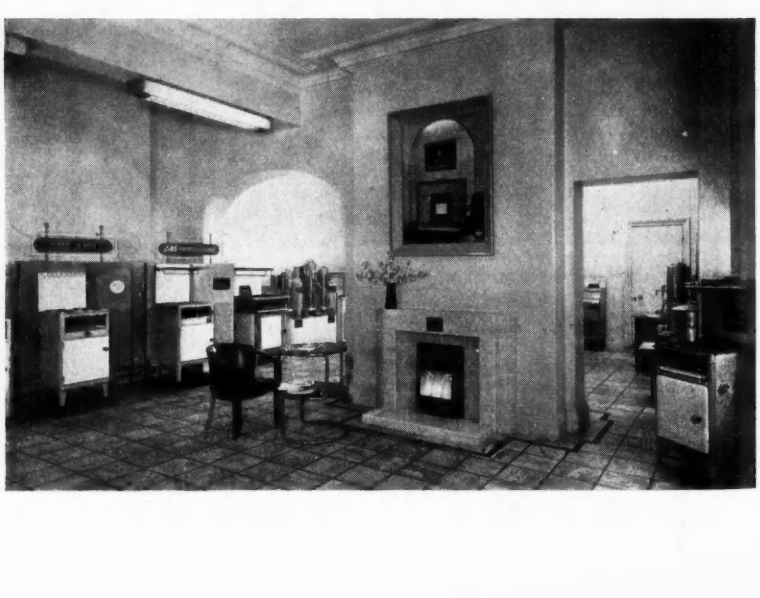
A Miniature Demonstration Theatre, in which audiences of 60 housewives at a time watched hourly cookery demonstrations by the Board's home service advisers, was a new feature of the North Western Gas Board's exhibit at the 19th Annual *Daily Dispatch* Brighter Homes Exhibition held in the City Hall, Manchester from February 19 to March 8. This 'little theatre' was additional to the Board's main exhibit which was a stand designed to show how gas and its many by-products play an increasingly important role in the home of today. A revolving by-product display included famous perfumes, nylon fabrics and finished products in nylon. During the first nine days of the exhibition, the Board's stand attracted more than 6,000 visitors.

LEEDS SHOWROOM EXTENSION

WHEN it is considered that at vesting day the City of Leeds, with a population of over half a million, had only one showroom, there is little wonder that the North Eastern Gas Board was faced with a problem.

First steps to relieve the congestion have been the extension of the existing Market Hall showroom by converting the first floor, which had previously housed general offices and stores, into an additional showroom and adjoining demonstration theatre. The latter has a seating capacity of 80 and has provision for a film projector unit.

The decorative scheme throughout is simple, clean and bright, and includes ivory walls, dark green curtains, and mottled brown and cream rubber tiled flooring. Our photograph shows a view of the new showroom extension.



CONSULTATIVE COUNCILS

'Coal Prices in Accordance with Statute'

FURTHER criticism of increased gas prices was made at a meeting of the West Midlands Gas Consultative Council at Birmingham on March 31 under the chairmanship of Councillor W. H. Malcolm. Complaints were said to have been received from individual consumers and it was also stated that the Federation of British Industries was gravely concerned at the recent increase. A question was asked as to special rates under the new structure, which, it was stated, was being taken up from headquarters.

A Lichfield member protested against the big increase in price in her district. She gave an example of an average domestic household where for a small quantity the charge had gone up from £3 17s. 9d. to £4 18s. 6d. For an industrial account which was formerly £381 13s. 1d., the amount under the new rate was £612 10s. The Chairman said this protest had been forwarded direct to the Board and no doubt a reply would be sent.

Mr. H. Baker called attention to a case in which he said a gas oven had been installed by a contractor. In these days when there was so much need for economy he thought an undertaking should carry out its own installation, and not put it out. It was reasonable to suppose that the costs were twice if a contractor was employed.

Mr. J. Fallon said the suggestion that a contractor's price was double was absurd.

The Chairman said there were two sides to this matter and if the particulars were supplied he would make enquiries, and they could discuss it further.

Coal Board's Responsibility

Letters were placed before the council following the resolution passed at the last meeting alleging discrimination by the N.C.B. in reference to coal prices. On behalf of the Minister of Fuel and Power, Mr. R. N. Quirk wrote explaining that, under Section 1 (1) (c) of the Coal Industry Nationalisation Act, 1946, the National Coal Board was responsible for 'making supplies of coal available, of such qualities and sizes, in such quantities and at such prices, as may seem to it best calculated to further the public interest in all respects, including the avoidance of any undue or unreasonable preference or advantage.'

The coal price structure adopted by the National Coal Board was therefore its own responsibility. Although the Ministry was consulted about the general principles underlying the new price structure before it was introduced, this did not detract from the Board's responsibility generally, or in particular. The safeguard provided under the Act for large coal consumers was the Coal Consumers' Council, which had among its members persons connected with the carbonisation industries. Various drafts of the National Coal Board's proposals were discussed by the Industrial Coal Consumers' Council last year.

Mr. Quirk's letter concluded: 'No doubt the Coal Board is satisfied that it has acted in accordance with the Statute.'

An extract from a letter from Sir Ernest Smith, Chairman of the Industrial Coal Consumers' Council, to the British Coking Industry Association and the Low Temperature Coal Distillers' Association, stated that the Council had come to the conclusion that in the form in which the new prices were introduced on December 31, 1951, the Board had not accorded undue or unreasonable preference or advantage to domestic or industrial consumers of coal at the expense of the carbonisation industries. In reaching this conclusion, the Council had regard to the fact that during the past year while the various aspects of the proposed new structure were under consideration by the Board and by the Council, the Board had consulted, directly, the representatives of the principal groups of consumers, including the carbonisation industries.

Strongly divergent views were held by the representatives of the various interests consulted, which could not all be satisfied by any one method of evaluating coals, but the Board modified its original proposals to meet to some extent the claims of the carbonisation industries. Bearing in mind that modification and the categorical assurance that where a carbonisation coal was sold for any other industrial purpose the same price was charged, the Council took the view that the Board had carried out its duties in a reasonable manner and had not discriminated unreasonably between the carbonisation industries and other industrial consumers.

A further communication on public lighting at Kidderminster was received from Mr. G. le B. Diamond (Chairman of the West Midlands Gas Board) in accordance with a promise to make further enquiries, and it was stated that past and present rates of charges for gas and maintenance had been examined.

Mr. Diamond wrote that it was not for the Board to account for the low prices quoted by the former Kidderminster Gas Company in 1945, but it might be stated that the revenue from the sales of gas and the resultant financial position of the Company were dependent upon the average price per therm received in respect of all the gas sold, rather than from that fraction of total sales for public lighting. If, therefore, for any reason the directors judged it expedient to provide public lighting below cost, even though it reacted on the price charged to other consumers, they were free to do so.

Less Freedom

The Board, on the other hand, had less freedom and much wider responsibilities. Consequently, the price quoted for gas in 1950 reflected the costs which confronted the Board at that time. The price of 11.59d. per therm was, in fact, just sufficient to cover the prime cost and capital charges of manufacture of gas, leaving no margin to cover distribution costs, administration, rates and other general expenses. At the same date, wage rates were more than double those of June, 1939, and the quotation of £1 7s. per lamp per annum which it allowed the then District Manager to make had, in fact, been insufficient to cover prime costs.

The policy in respect of charges for gas for public lighting in the West Midlands had now been settled and was embodied in the gas tariffs operative from March 31, 1952. The special reduction of 1d. per therm represented the maximum concession which could be made in respect. Obviously, the resultant cost would depend on local policy such as the capacity of the lamps, the distance between the columns and the hours of lighting. In respect of any of these problems the Board would gladly offer its co-operation and technical advice where so invited.

Reply to South Eastern Protest

A REPLY from the Ministry of Fuel and Power to the South Eastern Gas Consultative Council's protest against the new price of coal to the gas industry was received at its meeting at Caxton Hall, Westminster, on April 1. Mrs. D. N. Rathbone, the Deputy Chairman, presided in the absence through indisposition of the Chairman, Councillor A. B. Constable.

The Ministry's reply was similar to that addressed to the West Midlands Council (see this page) and forms the subject of comment in our editorial columns this week. The members considered it to be wholly unsatisfactory and no answer to the principal question of why the price of coal to the carbonising industries was higher than for any other class of consumer. As one member remarked, it dodged the issue. After considerable discussion, the Council decided to obtain all possible information on the subject from the officers of the Gas Board with a view to taking up the matter again with the Minister.

In the course of other business, the Council considered a request from an employee of the Board for the issue of official uniforms for purposes of identi-

(Continued on next page)

fication. It was agreed that this was an industrial matter which should be handled through the normal machinery of employee representation.

The Croydon Chamber of Commerce raised the question of joint reading of gas and electricity meters in the interests of economy. The Board's view, as a result of preliminary investigations, was that such a policy was not satisfactory in operation, but having regard to the urgent need for economy the matter was being reviewed. The Council asked to be informed of the Board's further views on the subject in due course.

From Hastings came a protest against the increased price of gas, with a request for the setting up of an impartial enquiry into all cases of price increases. In this connection reference was made to the recent resolution by the Association of Municipal Corporations asking the Government to introduce legislation to provide for an appeals tribunal for such purposes. A member of the Council who had been present at the Association's meeting said that he had voted against the resolution (which had been carried by a large majority) on the grounds that consultative councils already existed to protect consumers' interests in such matters, and that an appeals tribunal would be usurping the functions of the consultative councils.

A Guildford consumer complained that the price of a gas cooker in the local showroom was several pounds dearer than that of an identical appliance in the Hindhead showroom—the latter being in the area of the Southern Gas Board. The Secretary of the Council (Mr. E. Wood) explained that each area board fixed its own retail prices for appliances in accordance with its individual policy and that consequently they might differ as between one locality and another. It was agreed that this matter should be raised at the next meeting of Consultative Council Chairmen to see whether any uniformity could be achieved in this respect.

The Council received a statement on the South Eastern Board's mainlaying proposals with a view to improving the supply in various districts.

Film Evening.—Some 140 employees of the undertakings in the Colwyn Bay group of the Wales Gas Board had a 'Get-Together' to see gas industry films and to meet one another from the respective undertakings on March 21, at the Hydro Hotel, Llandudno.

Wellington (Salop) Chamber of Commerce is endeavouring to arrange a meeting of the Chamber, the National Farmers' Union, Wellington Markets Company, local residents and the Urban District Council, to discuss a joint plan of action against the proposal to build a new gasholder at Spring Hill, Wellington.

Cost of Living.—Details of the new weighting of the cost of living index were published in the March issue of the *Ministry of Labour Gazette*. The new weight for the fuel and light group is 66 per 1,000, compared with 65 per 1,000 in the old index. The weight of coal and coke has decreased from 41 to 30; Electricity has increased from 6 to 14 and gas from 14 to 18.

EASTERN SECTION VISITS ST. ALBANS

MEMBERS of the Eastern Section of the Institution of Gas Engineers responded in substantial numbers on March 26 to the invitation of their Chairman, Mr. T. C. Battersby, Divisional General Manager of the Watford Division, Eastern Gas Board, to visit the St. Albans works, for which Mr. Battersby was more intimately responsible before his promotion, first to Director, General Manager, and Chief Engineer of the Watford and St. Albans Gas Company, and latterly to his present position. Before touring the works the members lunched together informally at the Waterend Barn Restaurant, where Mr. Battersby extended a warm welcome.

Over two-thirds of the gas made at St. Albans is compressed up to a maximum of 25 lb. per sq. in. on peak loads to supply outlying areas. There are two steam driven Bryan Donkin compressors each with a capacity of 200,000 cu.ft. per hour, and a third compressor of similar size is driven by an Allen diesel engine. Gas is also sent into the Watford distribution system by two 125,000 cu.ft. per hour Waller Roots machines at lower pressures. The St. Albans works, the subject of considerable controversy at the public enquiry into the Eastern Gas Board's proposals for extensions in 1950, is noteworthy for its water treatment arrangements. Supplies are drawn from wells in the chalk and preliminary softening with lime and soda is carried out in Paterson plants. A new 'Accelerator' unit with a nominal capacity of 10,000 gal. per hour has just been completed. The two old plants will be retained as softened water storage tanks and standby units. After this treatment the water passes through carbonaceous zeolite in a 'Filtrator' plant, where alkalinity is reduced to low concentration and the hardness to zero. The zeolite is regenerated with dilute sulphuric acid and brine. The completely softened water is pumped to boiler feed tanks and the cooling system.

The works sidings have been extended recently to cope with increasing traffic, wagons being moved by a Fowler diesel driven locomotive. A new Strachan and Henshaw coal plant is capable of handling 60 tons per hour. A comprehensive scheme for the efficient utilisation of exhaust steam is incorporated in a works development plan now in hand.

Following the public enquiry of 1950 extensions have been authorised which will increase the nominal capacity of the works to a maximum of 20 mill. cu.ft. per day. The new plant will consist of a 4 mill. cu.ft. per day installation of continuous verticals, a third carburetted water gas set, and tower purifiers to treat 8 mill. cu.ft. per day. A hand operated water gas plant will be displaced and the horizontal retort settings will be dismantled.

Mr. F. A. Rhead, Senior Vice-Chairman, after a buffet tea in the works canteen, expressed the thanks of the visitors to the Eastern Gas Board and to all concerned in arranging such an interesting visit. Responding, Mr. Battersby gave credit to the members of the St. Albans staff who had acted so efficiently as guides.

Good Suggestions

EMPLOYEES of the North Thames Gas Board have made 159 suggestions during the past 12 months for improving the efficiency of the Board's working. A special awards committee, representing both management and employees, has considered each suggestion and made cash awards to the originators of 69 of the entries which were considered to be both original and practical. At the latest presentation of awards, 27 employees received cash awards totalling nearly £150 for their suggestions.

Top award was given to F. Willcox, a tinsmith employed at Brentford, for his suggestion for a modified form of escapement on the Fairweather recording calorimeter. Incidentally, this was not the first suggestion from Mr. Willcox which has merited an award. Seven of those named in the latest list (apart from Mr. Willcox) have earned awards previously. They are: P. A. Aldridge, crane driver, Beckton; C. G. Bland, retort pipe fitter, Beckton; L. R. Callis, carpenter, Southall; W. G. Culham, gas fitter, Southend; R. H. Gobbett, electrician, Fulham; A. Gurteen, gas fitter, Chiswick; and C. W. Ramsay, fitter, Beckton.

Since the end of the war more than 700 suggestions have been submitted for consideration, and 331 of these bright ideas have earned cash awards.

Oxford Dinner

OWING to the Budget the cost of gas may rise again in the near future, Mr. S. V. Smith, a member of the Southern Gas Board, told the annual dinner of the Oxford and District gas undertaking. Mentioning the controversy regarding the possible removal of the works, Mr. Smith said that there seemed to be far more people interested in what Oxford looked like from the outside than there were people who were determined to do something from the inside.

There were 2,000 more consumers today than at vesting day, and 85% of the new houses being built in the area were being provided with gas.

Mr. S. C. Bentley, Engineer and General Manager, replying to the toast of the undertaking, welcomed the members of the Board who were present, and Mr. Alexander Tran, General Manager, Northern Division, and colleagues from Aylesbury and Banbury.

Mr. Alexander Tran, responding, said they had had three years of nationalisation. Many of them had doubts about its possibilities at first, but they had few doubts now. Mr. S. E. Whitehead, Deputy Chairman of the Board, said they were a very happy team.

Mr. Bentley paid tribute to Mr. F. Harris, Hon. Secretary of the Sports Club, who is retiring after having occupied the position for four years.

JUNIOR ASSOCIATIONS

LONDON AND SOUTHERN

FIFTY members of the London and Southern Junior Gas Association were the guests on March 20 of Electroflo Meters Co., Ltd. They were accompanied by Mr. J. D. C. Woodall (President), Mr. C. D. Shann (Senior Vice-President), Mr. W. Johnson (Junior Vice-President) and Mr. J. E. Gray (Secretary).

Mr. G. H. Barker (Joint Managing Director) welcomed the guests and spoke of the Company's extension factories at Maryport, Cumberland, and the new Research Laboratories being constructed. A talk, illustrated by lantern slides, was given by Mr. L. S. James (Manager of the Gas Industries Division) to provide a background to the works tour. Many large instrumentation schemes for new carbonising centres were illustrated to show the methods adopted by various undertakings in siting recording panels on a works. The Company's numerous installations in the distribution field were also illustrated to show how remote pressure and flow measurements have assisted in the growth of modern high-pressure grid systems. The development of remote measurement, remote automatic control of terminal pressure, was also described and a typical installation illustrated.

Small parties of visitors were then taken round the works, viewing special demonstrations on the way. One was a working model of a pumping system feeding into a district. The demand was continually fluctuating, town gas being substituted by compressed air. The terminal pressure was maintained constant by automatically loading the works governor (in practice it could be a compressor) so that just the correct

Mr. L. S. James explains a gas distribution panel to a group of visitors which includes (extreme left) Mr. J. D. C. Woodall, the President, and (third from left) Mr. C. D. Shann, Senior Vice-President.

amount of gas was sent out. Another model demonstrated the operation of a stock indicator for a remote district holder incorporating an automatic alarm device. The transmission was made over model G.P.O. lines, and telephonic facilities were also available over the same pair of wires.

The complete range of instruments made for the gas industry by the Company was seen being made and tested, including sensitive relay type governors for controlling retort pull, gas/air mixing, chemical dosing and other applications. The Solway Flowrators Co., Ltd., an associated company, demonstrated various models of variable area flow meters for indicating, recording and transmitting applications. These simple instruments are much used for gasworks liquors at flow rates from 4,000 g.p.h. down to as low as 2 g.p.h.

A highlight of the tour was an inspection of the automatic boiler control panel for Croydon power station where visitors were able to walk around inside the panel. The size of the interior was as large as many a kitchen in a modern flat.

At the conclusion of the tour the visitors took tea in the Company's canteen, a vote of thanks on behalf of the association was moved by Mr. J. D. C. Woodall and responded to by Mr. L. S. James.

MIDLAND

THE Annual Dinner of the Midland Junior Gas Association was held on March 1 at the Imperial Hotel, Birmingham. The toast of 'The Association' was proposed by Mr. G. R. N. Sperryn, who drew attention to the fact that the membership of the Association, in its 48th year, had almost reached the figure of 500. He emphasised the fellow feeling which existed between the industry and its associated firms, and he welcomed the close co-operation which representatives of outside firms enjoyed when dealing with members of the industry.

The President of the Association, Mr. R. B. Watkins, responded, recalling some of his experiences when collaborating with Mr. Sperryn.

The toast of 'The Ladies' was proposed by the Senior Vice-President, Mr. D. J. Ward, and Mrs. R. B. Watkins responded. Mr. J. A. Tomes, Junior Vice-President, proposed 'The Visitors,' saying how very welcome they were and how pleasant it was to be able to meet their guests. He also thanked them on behalf of his colleagues for all the assistance so generously given on all matters affecting their common interests.

Mr. S. M. Milbourne responded to the toast, referring to the long association his family had enjoyed with the gas industry. He said how honoured he felt at being invited to attend the annual dinner and he welcomed the opportunity for renewing acquaintance with those members whom he had encountered in the course of business. He also extended a personal welcome to the members of the Association on the occasion of the forthcoming visit to his works at Donnington.

CHEMICAL WORKS SAFETY RULES

A NEW volume of Model Safety Rules for Use in Chemical Works, Part II—Detailed Instructions—has been published by the Association of British Chemical Manufacturers. It will be recalled that the work is divided into two parts. The third edition of Part I—Model Rules was issued in May, 1947; Supplement No. 1 issued in October, 1950, covering the Factories Act, 1948, and bringing the Model Rules up to date is incorporated in the latest version.

Part II, the present book, is the completion of a project begun in 1928. The first section of Part II was issued in provisional form in 1930, but only since the war has it been possible to return to the task of collecting and correlating the mass of information involved.

Soon after the cessation of hostilities the Council appointed a new Works Safety Committee to revive the Association's safety activities, with the object of taking account of the far-reaching advances in chemical technology that had been made during the previous decade. The Council of the Association regards it as essential that safe working conditions shall keep pace with technical developments in order that the chemical industry shall offer attractive and congenial employment. A revision of Parts I and II of the Model Safety Rules was given the first priority. As already indicated, Part I has been brought up to date. Part II has now been completed and is issued under the authority of the Council.

So far as is known there is no comparable book in the English language dealing specifically with chemical works and setting out in such detail what safety precautions are required, how these should be arranged, and where the necessary information can be obtained. The compilation of the book was undertaken by the Works Safety Committee of the Association primarily as part of the safety services rendered by the Association to its members. The book is, however, being made available in the cause of safety to all interested in the subject. It is hoped that the information will be useful to all who have to deal with safety not only in the chemical and closely allied industries, but also in the wide range of industries which use chemical products.

In a foreword, H.M. Chief Inspector of Factories has welcomed the initiative of the Association in compiling this information and hopes it will be closely studied. Attention is drawn to the method of numbering and indexing the sections and paragraphs on a decimal system which enables the particular item to be located in a matter of seconds. The index, in fact, occupies 46 pages as compared with 236 pages of text.

Copies can be obtained from the Association, price 25s. per copy, post free, *cash with order.*

SPOON-FEEDING AND CARBONISING EFFICIENCY

By H. DEARNLEY,
North Eastern Gas Board

Presidential Address to the Yorkshire Junior Gas Association

AN examination of the membership of our Association over the past number of years reveals the fact that, while we are growing numerically, we appear to be losing the support of the 'real juniors.' This may be accounted for partly by military service, but the rot had set in prior to this and has only been accentuated by it. We are repeatedly told that modern youth is much bolder than his forefathers were at his age, but it is a striking fact that in all technical discussions which take place in this and other similar associations the voice of youth is most conspicuous by its absence. These observations lead one to ask two pertinent questions: Are the junior associations functioning in the best interests of juniors; and are the associations best serving the industry as at present functioning?

Have we sub-consciously become jealous of the senior associations and striven more and more to show the seniors that in our opinion the standard of our knowledge is equal to theirs and that we are capable of presenting technical papers of which even they would be proud? If this is correct, perhaps it is not surprising that our juniors are fighting shy of joining us, as we are unwittingly inculcating into them the handicap of the inferiority complex.

Spoon-Feeding

On the other hand, the tendency is that juniors who enter the gas industry today, and indeed most other industries, are being more and more spoon-fed. On the average, they are allowed somewhere approaching 20% of their working week to attend day classes and, consequently, in many cases attendance at evening classes, and particularly technical meetings, which are held outside working hours, tends to be regarded by them as an imposition, and it is only when they reach a more mature age that these values assume their proper perspective.

I think the best things in life are those which call for most effort. I am of opinion that the pendulum has swung too much on the concessional side and that the 'returns' are problematic.

A system of education which demands attendance at classes for a limited number of hours per week is probably of benefit only to the minority, and I often wonder if a better proposition would be a departmental exchange of personnel for 1-1½ days per week instead of allowing time off for attending day classes. For example, a youth employed in a works laboratory would spend his allotted time each week in the drawing office, distribution department, or industrial department, and it might be possible for his place in the laboratory to be taken by a contemporary in one of the other departments. Assuming this arrangement was a four years' course, by the end of the training period he would have become a most valuable member of the staff. A glance at the pass list of the Institution Higher Grade Certificates in Gas Engineering and Supply over the past few years tends to give support to this suggestion.

A really ambitious youth will make sure he obtains academic qualifications whether in his own time or in that of his firm. I suggest that the type of scheme outlined would tend to make a less ambitious youth more ambitious and, even if this improvement did not materialise, he would be in a position to give better service to the industry.

The papers read before the junior associations over a number of years have reached a high standard technically, and the number of technical papers given to these associations constitutes a big percentage of the total papers from all sources. If sufficient juniors were interested, an auxiliary meeting could be held, say, every four or five weeks during the winter months, when one or two seniors could be present to guide the discussion. At these meetings, each member would be asked to speak from notes on a particular subject for a period of not longer than two or three minutes. Discussion would then follow, and I think it would not be long before the junior was taking part in discussions at the association meetings.

Control of Labour

The control of labour becomes more and more delicate, and a major problem which faces all industries is the training necessary for the most efficient supervision of labour. The gas industry has the choice of two potential markets for its administrative staff—namely, the university graduate and the boy who leaves school at the age of 16-17 years, having reached an educational standard equivalent to, say, Higher School Certificate.

The university graduate enters the industry at an average age of 24. The fact that his education has reached this high standard, plus his environment over a number of years, tends to give him—and probably quite rightly—a superiority complex, a complex which remains with him through life and in fact is part of him. His first appointment as a fully developed man is at a reasonable salary and hence the humdrum routine jobs do not come within his sphere, or, if they do, the time spent is short. His approach to the workmen is a reflection of his complex and, although they treat him with respect, they fight shy of giving him their confidences. However, I would stress herewith there are exceptions to every rule.

The boy of 16-17 years of age who enters the industry is usually far from being developed physically. He is recognised by the workmen as a lad in the full sense of the word. His duties, which for some years are menial, take him to all parts of the works. He makes contact with all types of men, and as at this age he has not had time to develop a complex; jokes and leg-pulling are exchanged with the men and, gradually, confidences and then contacts and techniques are developed which are denied the university graduate.

What the intelligent schoolboy has missed in further full-time education is partly compensated for by his experience and acquired confidence in the handling of men, and it often happens that it is he who makes the best works manager.

On the other hand, there is the type which, though spoon-feeding, tends to develop into a cross between a secondary schoolboy and a university graduate, and this often results in the development of a semi-snob. This type of man offers little competition in any field to the university graduate, who is anything but a snob but has the disadvantage of not having passed through the 'train them young' school—training which is so important in the control of men.

Hard work and experience gained early in life can eventually take the young members of the gas industry into the administrative field alongside university graduates.

Carbonising Practice

The soaring prices of coal and of plant used in the carbonisation of coal must inevitably lead to appreciable increases in the price of gas to the consumer unless the manufacturing or distribution costs can be materially reduced. Can these costs be reduced—if so, where and how? This question has been and is occupying the minds of all thinking men in the industry. The solution at the moment appears to lie in a tightening-up of known and accepted supervisory duties.

Whenever this problem has been uppermost, the technicians have immediately confined their attention to the retort house, with perhaps small but certainly cumulative success. I believe

that to-day the economic hope lies chiefly in that direction. No immediate revolutionary change in the carbonisation of coal is likely to take place. Progress is naturally a slow process, and while I think that important contributions to this could be made: (a) by the design of a setting with an easily interchangeable retort, and (b) by increasing the rate of heat transfer of the retort material (and this may mean a switch from fireclay to metal); it is on the carbonising plant as it exists today that we shall have to focus our concentrated effort. Most gasworks have operated in the past under 'hit and miss' conditions. If nationalisation has no other virtue, the change has been fully justified by the serious efforts now being made to place these undertakings on a much sounder technical basis.

Therms Per Ton

It is common practice to assess carbonising results solely on the number of therms obtained per ton of coal carbonised. Yet it is possible, owing to the different quality of coal used and the different quality or type of diluent added to the coal gas, for a works producing less therms per ton than another works to be employing a better carbonising technique. The thermal yield as a basis of comparison of coals being carbonised by different systems fails because diluent gases, added with or without control, so greatly influence the final figure. The H.E.V., however, being uninfluenced by diluents and being a direct measure of the thermal production of the higher calorific value hydrocarbons, is a much more reliable guide. It is a number of years since Dr. S. Pexton produced his famous yardstick; yet I doubt if the significance of this formula is properly appreciated even today, though I am convinced it is a vital factor in the method of evaluating the distillation of coal in a gasworks.

For a similar H.E.V. number, the calorific value of the gas and the cubic feet produced can vary considerably, but when the thermal yield is calculated to a standard calorific value by dilution with blue water gas (300 B.Th.U.) the resultant thermal yield is the same.

During my younger days, there was fierce controversy as to whether one B.Th.U. was as good as another. While not entering into a discussion on that subject, I do state that one therm is not necessarily as good as another. In my paper on carbonisation read before this Association in 1946, I gave a description of a 1/100 ton coal test plant operating at the Meadow Lane works. At that period, we were heating the cast iron retort by producer gas, but about two years ago, for several reasons, we decided to convert the firing of the setting from coke to coal gas. As usually happens when major changes take place in a plant, we had our teething troubles, and one of our biggest troubles was excessive retort temperatures.

It is often said that good comes out of evil, and so it was in this case, as we had a demonstration of four important factors: (i) The value of H.E.V.; (ii) the importance of temperature on carbonisation; (iii) the importance of heat transfer on the time factor of carbonisation; (iv) the influence of a reducing atmosphere on the corrosion of a cast iron retort when working at high temperatures.

Under the old system of heating the retort setting by coke, it was usual practice to maintain a retort temperature before and after charging round about 990° to 995°C., and the time taken to carbonise the charge of 22.4 lb. of coal averaged 44-45 min.

Following the change-over to coal gas firing, in the initial stages we found after the charge had been withdrawn that the retort temperature had reached a figure of 1,080°C. and the time taken to carbonise the coal was reduced to 30 min. In view of the interesting results obtained, we decided to continue to work this particular retort at these high temperatures, fully realising that the life of the retort would be greatly reduced.

After each coal is tested, the results are compared to the average of the tests obtained of that particular coal during the previous coal testing year, known as the 'bulk test.'

(*Concluded on p. 98.*)

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The following are results of typical tests of coals carbonised at high temperatures compared with 'bulk tests.'

	High Temperatures				Normal Temperatures (Bulk Tests)			
	Cal. Val. of gas (gross)	Therms (gross)	H.E.V.	Carb. time (min.)	Cal.Val. of gas (gross)	Therms (gross)	H.E.V.	Carb. time (min.)
Coal A ...	574	80.2	37.7	30	668	76.1	41.5	46
„ B ...	555	74.3	33.6	30	635	72.5	37.8	47
„ C ...	556	77.4	35.1	29	621	69.3	35.3	45
„ D ...	634	78.2	40.6	32	641	72.2	37.9	44

If we examine these results we find that:—

Coal A has a 5% superior thermal yield to the bulk test, but when compared with H.E.V. it is 9% inferior.

Coal B is 2% superior on a thermal basis, but 11% inferior on H.E.V.

Coal C is 12% superior on a thermal basis and equal on H.E.V.

Coal D is 8% superior on a thermal basis and 7% superior on H.E.V.

To complete the structure, we will compare the original test with the bulk test after the two gases (original and bulk) have been diluted with blue water gas (300 B.Th.U.) and producer gas (calorific 125 B.Th.U.) to a common calorific value of 500 B.Th.U.

	Dilution with B.W.G.	Dilution with Prod. Gas
Coal A	9% inferior	1% superior
„ B	11% inferior	1% inferior
„ C	Equal	8% superior
„ D	7% superior	8% superior

Coal A is recognised as one of our best coals and the test results normally are very consistent. Assessed purely from the therms obtained per ton, the result of the test on this particular coal would be reported as being 5% superior to the bulk test, and yet, if the diluent gas required to reduce the calorific value to the set standard was blue water gas, the final therms obtained would be 9% less. If the diluent gas was producer gas, 1% more therms would be obtained.

Coal C is one of our worst types of coal and, here again, if therms per ton of the straight coal gas were taken as the basis of assessment, the coal would be reported as being 12% superior. In actual practice the comparative assessment, using blue water gas as the diluent, would be 'equal,' and with producer gas 8% superior.

A Downward Path

One has often heard eminent men in the industry query whether it is possible in practice to reach a carbonising temperature where the gaseous thermal results obtained commence a downward path. The results obtained with Coal B, and confirmed by other tests, definitely suggest that with this type of coal the carbonising temperature has been too high. Compared with the bulk test, the coal is 2% superior, but when diluted with B.W.G. or producer gas the comparison is 11% and 1% inferior respectively.

When coal C and coal D are carbonised at an excessive temperature, the value of the fuel jumps from a mediocre to a first class coal.

The above examples clearly show the effect of temperature on carbonisation and also emphasise the fact that different coals require different carbonising temperatures if optimum results are to be obtained, although, when producer gas is the diluent, the latter statement is much less significant provided the carbonising temperature is high. In view of this statement, I submit that in works practice increased efficiency can be obtained by limiting the types of coal used to a minimum and, if possible, confining that minimum to coals which fall in a similar category. In the tests quoted the carbonising time has been reduced by as much as 35% from the normal.

The importance of the rate of heat transfer through the carbonising mass cannot be too strongly emphasised. The benefit which would accrue by accelerating the heat transfer through present-day carbonising units would be of major importance. During the life of the industry, retorts have changed from metal to fireclay, and one wonders if, in this more enlightened age of the technology of metals, a reversion to the metal retort will take place in the future. It should not be beyond the skill of man to design a retort setting in which the retorts can be changed without the present very costly necessity of completely demolishing a setting in order to renew the retorts. If this could be accomplished, I am confident that refractory material could be made which would materially accelerate the rate of heat transfer. Although the life of the retort might be considerably reduced, this would be more than offset by the therms of gas obtained.

The scope available for increasing the rate of heat transfer can best be illustrated when I point out that carbonising quite a normal coal in our experimental retort at normal temperature will give a thermal yield of 74 therms of 620 B.Th.U. gas, H.E.V. 38.0.

	Therms.
Diluted to 500 B.Th.U. with B.W.G. at 300 B.Th.U.	= 95.5
Diluted with producer gas at 125 B.Th.U.	= 78.8

A first class coal will show a thermal yield of 79 therms. C.V. of gas 645 B.Th.U., H.E.V. 41.9.

	Therms.
Diluted to 500 B.Th.U. with B.W.G. at 300 B.Th.U.	= 105.6
Diluted to 500 B.Th.U. with producer gas at 300 B.Th.U.	= 84.9

The effect of corrosion and 'growth' on cast iron when subjected to high temperatures does not fall within the scope of this paper. The subject is admirably dealt with by U. R. Evans in his book 'Metallic Corrosion, Passivity, and Protection,' and is referred to here only because it was an experience we had not before encountered.

The life of our cast iron retort was reduced from 17 weeks, which was the normal retort life when firing with producer gas, to four weeks when using gas in a reducing atmosphere.

The length of the new cold retort was 4 ft. 4½ in. The maximum length at carbonising temperature was 4 ft. 11 in., and after withdrawing from the setting its permanent length when cold was 4 ft. 8⅜ in.—an increase of 8%.

It is customary in most works employing more than one bench of retorts for the gas to be mixed before passing through the meter. Although I think that instrumentation can become an evil if not carefully controlled, I believe that a metering system on each bench, coupled with a recording calorimeter, would pay good dividends and especially so if, in addition, each bench had its own foreman—the smaller the unit the more efficient the supervision. I think any system which fosters the competitive spirit is most desirable. The common practice where one foreman is in charge of a large retort house has outlived its use.

In support of the small unit, I would point out that in my experience I have found that in the small works the number of therms of gas produced per ton is usually appreciably higher than that obtained in a large works when working at a similar coal throughput. Where the small works lose many points is in the amount of fuel used on the boilers and particularly on the producers, although this can be appreciably reduced by technical supervision.

ANALYSIS OF FLUE GASES

A BRITISH Standard Code for the Sampling and Analysis of Flue Gases (B.S. 1756:1952) has been prepared to guide industrial fuel consumers in selecting a procedure which may be adopted in sampling and analysing flue gases. It covers not only flue gases from steam-raising appliances and heating boilers but also those produced in the manufacture of iron, steel, non-ferrous metals, pottery, refractories, heavy clay ware, food, cement, glass, certain chemicals, and coal gas. Methods are given for the determination of the following gases:—Carbon dioxide, oxygen, carbon monoxide, hydrogen, methane, moisture, oxides of sulphur, and oxides of nitrogen.

Among the apparatus described are the Orsat apparatus for determining carbon dioxide, oxygen, and carbon monoxide and the Haldane apparatus for carbon dioxide, oxygen, carbon monoxide, hydrogen, and methane.

Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 24, Victoria Street, London, S.W.1. Price 10s. 6d. post free.

GAS MASKS, RESUSCITATION, AND FIRST AID

By J. W. GREEN (Stroud)

Paper at a joint meeting of the Western Junior Gas Association and the Wales and Monmouthshire Junior Gas Association at Gloucester, March 15, 1952.

THE annual report of the Chief Inspector of Factories for the year 1949 states that the total number of accidents notified under the Factory Act was 192,982, of which 772 were fatal. These totals show a most welcome improvement on 1948 which were 201,086 and 861 respectively. The decreases shown as percentages are 4% in regard to non-fatal accidents and 10.3% to fatal accidents, the latter figure being especially encouraging.

The report of the South Western Gas Board for the first 11 months shows there were two fatal accidents, 221 involving personnel resulting in more than one week's absence, and 252 less than one week's absence from work. Many hundreds of small incidents also took place with the inevitable loss of countless hours of work.

Our main object in industry should be to cut down all accidents by prevention in the first place, but when they do occur to treat the injured with skill and speed, the result being the minimum of pain to the employee and reduction in lost working time.

First aid knowledge is always valuable, for, strange as it may seem, the incidence of wounds and other injuries (excluding death) even in the fighting services, is as great in peacetime as in war. The big decrease in the number of cases of sepsis deserves attention. This amounts to 3,442, or 17% of the 1948 cases, which were 20,247. It may well be that a higher standard of cleanliness has helped to bring this about, and no doubt, appreciation of risks of sepsis has led to better first aid facilities. Employees are slowly realising the importance of immediate attention to injuries, however slight. Adequate first aid arrangements with competent attendants and good propaganda are essential if this object is to be achieved.

First aid in cases of sudden illness or accident should be limited to emergency assistance until a doctor's services are available. The first-aider should never attempt to usurp the duties of the doctor; he should merely apply simple and effective measures to benefit the patient until the doctor arrives or the patient is admitted to hospital. The provision of adequate first aid facilities does not necessarily mean a large room full of white enamelled furniture, with white coats for the attendants. A well equipped first aid cupboard, with stretcher, blankets, and some washing utensils, are sufficient equipment to deal with the majority of accidents in our industry.

Gas Masks

When arrangements are being made on a works or district for a job where, through accident, gas may escape, the provision of gas masks and resuscitation apparatus is of first class importance. It is not possible to supply every man who works near gas with a respirator, so naturally cases of gas poisoning are sure to occur, especially on the distribution side, and as this work is so widely scattered, other steps must be taken.

At least once a year, every distribution man should be instructed on the treatment of gas casualties, on the following lines:

1. Removal of casualty from source of gas.
2. Advisability of calling ambulance service or treatment on job.
3. Shock treatment.
4. Advising officer in charge.
5. Demonstration of the Schafer method of artificial respiration.

Members of the British Red Cross or St. John Ambulance Service will be pleased to help if qualified instructors are not employed in the undertaking.

Section 27 of the Factories Act, 1937, reads thus: 'Where work has to be done inside any chamber, tank, vat, pit, pipe, flue, or similar confined space, in which dangerous fumes are liable to be present to such an extent as to involve risk of persons being overcome thereby:

'No person shall enter the confined space for any purpose unless the following requirements are complied with:—

(i) All practical steps taken to remove any fumes which may be present, and to prevent any ingress of fumes, and unless it has been ascertained by a suitable test that the space is free from dangerous fumes the person entering shall wear a belt to which there is securely attached a rope of which the free end is held by a person outside, or

(ii) The person entering shall wear suitable breathing apparatus.

'Suitable breathing apparatus and a suitable reviving apparatus and suitable belts and ropes shall be provided and maintained.

'A sufficient number of persons employed shall be trained and practised in the use of such apparatus and in the method of restoring respiration.'

Where breathing apparatus is now in use on any works, the following leaflet should be obtained—1949, No. 189. Breathing Apparatus, etc. (Report on Examination) Order, 1949 (No. 189), and the instructions strictly adhered to.

Air Lines

Air lines are a cheap and efficient piece of apparatus, but it cannot be to strongly stressed that the free end must be in fresh air on the windward side of the job, and when working in busy streets away from traffic fumes. This may seem obvious, but a fitter in a gasworks who was wearing one of these masks died, the only explanation being that the fresh air end was pegged too near the job.

Breathing in these masks is inclined to be slightly harder than normal breathing, which means that wearers will tire more quickly. In this case, two men working alternatively at 10 min. intervals will speed the job. The operator who is resting should keep near the free end of the tube, this will eliminate the chance of the strainer being covered with earth, or damaged in any other way.

The application of water to the eyepieces will save any discomfort from steaming of lenses.

Self-contained breathing apparatus is designed to supply the wearer with perfectly respirable air entirely independent of any communication with the outer atmosphere up to the number of hours the apparatus is designed for. It has no air pipe or any connection with the base of operations, so that for recovery, repair, and rescue work in gasworks its scope of usefulness is practically unlimited, the wearer being safe in the most poisonous atmospheres and able to walk any distance with every freedom of action.

For this work the Proto set, London Fire Brigade pattern, is an ideal job and very highly recommended. Its simplicity can be judged by the fact that 10 min. instruction is sufficient

(*Continued on p. 105.*)

for the wearer, after putting on the apparatus, to be able to handle it with safety and confidence.

The principle of this apparatus is that the wearer breathes the same air over and over again, the carbon dioxide being absorbed after each breath by the Proto-sorb in the breathing bag, and at the same time the requisite amount of oxygen is added, thus rendering the air fit to be inhaled again.

The number of men trained in the use of the apparatus depends on the size of the undertaking, but even on the smallest works more than one man should be available in an emergency. Whenever possible men should work in pairs. This procedure not only assists in morale, but in the case of mishap to a wearer his companion can help him to fresh air.

The initial outlay may seem heavy, but lives can never be balanced against £ s. d. At least once a month the men concerned should walk about in these masks. It is essential that this apparatus is kept in good condition.

The danger of attempting to remove an unconscious man from concentrations of gas without the use of breathing apparatus is often not appreciated in an emergency. In such circumstances men of long experience may dash unprotected into dangerous concentrations of gas in a courageous but nevertheless foolhardy attempt at rescue. This was only too true where a youth, who was assisting a gas plant attendant with 30 years' experience, was closing a steam valve on a raised platform. Proper precautions had been taken to isolate the section, but for some reason the water seal blew out causing a sudden emission of gas. The youth was quickly overcome and fell on the platform. The gas plant attendant climbed up to remove him but was so affected by gas that he had to leave the building. He called for help and several contractors' men who were inexperienced in this type of work rushed in to try to remove the unconscious youth. The foreman of this gang fell unconscious and all the others were also affected. The attendant meanwhile had turned off the gas by a valve located outside the building. The youth and foreman were finally removed by three experienced workers, but despite first aid treatment both died. Although breathing apparatus was available in the ambulance room about 100 yds. away, it was not used in the rescue attempts. Even the experienced men said they never thought of using this apparatus, their first impulse being, understandably, to remove the unconscious youth as soon as possible.

Breathing apparatus should be kept in such a position as to be seen by employees at all times. This procedure will materially assist when accidents do occur.

Artificial Respiration

The first stage of resuscitation is the application of the Schafer method of artificial respiration. This is a very simple method, but when practised for a short time will in many cases of gassing return the patient to consciousness.

It is most important to carry out the treatment immediately, and the following rules should be observed:—

(1) Clear the mouth of any obstructions including false teeth.

(2) Start artificial respiration. Do not stop until breathing has been established for at least a quarter of an hour; continue for two hours if necessary.

(3) Keep the patient as warm as possible with blankets, etc.

(4) When consciousness returns give hot drinks, do not let the patient sit up, and transfer to hospital as soon as possible.

The practice of walking men who have been gassed up and down the street should be stopped, as this throws extra strain on the heart. It is much better to allow the man to rest in the fresh air and remove them to their homes when sufficiently recovered. I feel sure that if officers in charge of jobs can give artificial respiration when the occasion arises, the confidence of the men will be greatly enhanced.

In the case of a man working, for example, inside a washer on a staging becoming gassed and falling to the bottom, the application of the Schafer method may have fatal results. For example, broken ribs may be forced into the heart. In this case, the Eves method can be safely carried out. Under air attack where people have been buried in earth, this system is strongly recommended. The apparatus consists, in this case, of a civil defence stretcher and a trestle made of scrap 2 in. angle iron. There are many variations, but the principle is the same.

The patient, after the removal of false teeth and loosening of tight clothing, is placed on the stretcher, hands and feet are tied, and a rocking movement of 12-16 times to the minute is carried out. This method is also useful where no skilled first aid man is on the spot, for any person can operate this with the minimum of exertion for many hours.

A simple oxygen-carbon dioxide apparatus is essential in every place where gas poisoning is likely.

Many types of apparatus are manufactured. In the Novox type the supply of the oxygen-carbon dioxide mixture is controlled automatically by the patient's inspiratory efforts, more or less of the gas being delivered to him according to his requirements. In this type, the gas can be administered by less experienced persons, a great asset in the gas industry where small gangs of men are spread over a large area.

Another small but efficient carbon dioxide resuscitation is the Sparklet. This apparatus consists of six small cylinders of carbon dioxide with face mask and breathing bag. Being small, light, and inexpensive, it is very useful when several small gangs are working away from headquarters. It cannot be too strongly emphasised that proper instruction must be given to the men whose job it is to use this outfit. It is obvious that it is not possible for all gangs to be provided with such an apparatus, but in all cases of main cut-outs or jobs where gas can escape, its provision will give confidence to the men and quickly return them to normal if accidents occur.

Electrocution

One of the commonest effects of small currents of electricity passing through a body is acute axphyxia due to the paralysis of the respiratory centre. The Schafer method of artificial respiration and oxygen-carbon dioxide should be administered at once, and in the majority of cases normal breathing will be restored. Death by electrocution is very difficult to diagnose even with a stethoscope. More than one victim presumed dead has recovered after prolonged treatment.

DISCUSSION

The President (Mr. T. W. Clapham, Bristol) opened the proceedings by extending a hearty welcome to the Wales and Monmouthshire Junior Gas Association, their President, Mr. S. G. Meade, Vice President, Mr. H. Buckley, and Secretary, Mr. R. J. K. Sheppard. Mr. Clapham mentioned that the author of the paper had won the Individual Championship for First Aid for the county of Gloucester in 1951.

Mr. A. B. Horsfield (Bristol) was surprised to learn that water was recommended for application to gas mask eyepieces in preference to anti-dim compounds as used during the war.

Mr. Green explained that from experience the Fire Brigade recommended the application of clean water to mask eyepieces in preference to anti-dim compounds, which were not always 100% satisfactory.

Mr. S. G. Mead (President, Wales and Monmouthshire Juniors) felt that too much care could not be given to the education of employees in the treatment of small injuries. He also felt that when men were working in gas it was essential

that they should know the characteristics of the gas they were dealing with.

Mr. F. R. Rendle (Plymouth) was of the opinion that Sparklet resuscitation might be preferred to the Novita or Novox due to its portability in an emergency.

Mr. Green pointed out that the Sparklet and Novox were designed for two different purposes. The Sparklet, designed for maximum mobility, was used chiefly on the district while the Novox, due to its heavier construction, was primarily for use in works or factories.

Mr. H. Buckley (Vice President, Wales and Monmouthshire Juniors) was interested to know if the provision of mineral water was of benefit where gas poisoning had occurred. He noted that certain contractors provided quantities of milk for their plant operators and technicians.

Mr. Green replied that mineral water was of little use other than it was a liquid, and the more liquid that could be given the quicker the poison in the blood stream was eliminated. Milk, having a food value, was preferable.

Mr. R. J. K. Sheppard (Secretary, Wales and Monmouthshire Juniors) felt that it could not be too strongly urged that in all cases of gassing the officer in charge should be notified at the earliest possible moment and all personnel should know his own works telephone number. He would like to know the recommendation in respect of the use of aspirin.

Mr. Green said that the natural reaction to gassing was a headache, and, to counteract this, rest was recommended without the use of drugs.

Mr. H. Hobbs (Swindon) was interested in the means of timing when using the Schafer method.

Mr. Green remarked that accurate timing was most difficult to attain but they need not worry about this unduly. The main thing was to give resuscitation at once at whatever speed.

Mr. L. Billing (Bristol) commented that the old treatment was to walk the man about and give aerated water, even Seidlitz powder. It should be remembered that the damage was in the lungs and not the stomach, and the treatment was now warmth, rest, and no drugs.

Mr. Meade instanced a bad case after a meal where sickness might accelerate choking.

Mr. Green said that in such cases two men should be available, one to carry out resuscitation and the second to keep the patient's mouth free. In such cases the patient must be watched all the time.

Mr. F. Craxford (Taunton) was of opinion that most distribution men were gassed because too little ground was removed, entailing working directly over gas. He would like to know of the author's reaction in regard to splints.

Mr. Green replied that splints were discouraged as they could in certain cases aggravate an injury. A sound guide was to tie the injured limb in a comfortable position.

Mr. B. G. Hawkings (Plymouth) commented that in his opinion the most important squad was the service layer and mate, and it should be ensured that they had steady minds. The question facing the service layer would always be: Should he dash for help or attend to his mate? When masks were assembled it was most important to see that all unions in air lines were fitted with washers. In his experience a man wearing a mask was gassed for no other apparent reason than a missing washer. As these men could not help having dirty hands he doubted the advisability of their applying first aid dressings. Did the author recommend iodine?

Mr. Green replied that in all cases where a man was gassed it was his mate's first duty to remove him to a place of safety. If he was not breathing, then artificial respiration should be applied. It should not be difficult for anyone to apply a first aid dressing, as no good first aid man ever touched the part of the dressing which covered a wound. Iodine was not to be recommended as its stinging effect was a deterrent to its use on small injuries. Aquaflavine, without this drawback, should be substituted.

Mr. A. Rae (Bath) proposed a vote of thanks to the author and this was seconded by **Mr. O. Pincock** (Weston-super-Mare).

ISOLATING SERVICE PIPES

A PROVISIONAL patent (No. 7572/52) by the Northern Gas Board and G. E. Haddon, of Stockton-on-Tees, has for its object the provision of improved means for isolating gas and similar service pipes for testing and like purposes. Means for isolating pipes in accordance with the invention comprise a coupling member having at each end a pipe-receiving socket and interposed a holder into which a plate can be inserted to close the passage through the coupling member, means being provided for sealing the plate-receiving slot in the holder when the plate is withdrawn.

For example, the coupling member may be of standard size and be cast in malleable iron in one with its interposed plate holder, the holder comprising a U-shaped portion provided with a central aperture concentric with the internally-threaded sockets in the ends of the coupling member and of corresponding size. A narrow transverse slot is provided in the flat top face of the holder, the ends of this slot merging into a groove or channel extending around the central aperture. The slot and channel are filled with a suitable sealing material such as wax, tallow, graphite, putty, clay, or a commercial sealing paste.

Normally the slot is closed by a flat cap secured on the holder top by screws passed through its ends into threaded sockets in the sides of the holder portion, suitable packing material being inserted between the cap and the holder top to make a gas-tight joint. Under these conditions there is a free passage (as, for example, for gas) through the coupling member. When the cap is removed, a thin U-shaped plate, which may be of stainless steel, brass, bronze, aluminium, plastic, or other material, can be inserted into the slot and pressed home so that its edges engage in the channel around the central aperture in the holder portion, thus shutting off the free passage through the coupling member. The edges of the plate are sharpened to cut cleanly into the sealing material in the slot and channel, thereby sealing off the aperture. A finger slot is provided near the top of the plate to facilitate its withdrawal from the holder.

In use, the device can be employed to couple together the usual branch pipe from the gas main and the service pipe leading to the consumer's meter, and, for the purpose of testing the latter, the plate is inserted in the slot in the holder portion of the device to shut off completely the connection from the gas main. If necessary, additional sealing material may be luted around the plate in the aperture in the holder before the service pipe is introduced into the coupling.

In the case of a new installation, or the renewal of one which has been out of use for some time, where usually a trench is dug to uncover the connection to the gas main, the device allows the service pipe to the meter, and, if desired, the internal installation, to be tested under pressure before the plate is removed and the trench filled in and again after the trench has been almost completely filled in and the soil rammed home, thus ensuring the detection of any leakages in the service pipe. As the U-shaped sealing plates are interchangeable, their number may be small as compared with the number of coupling members provided. After testing has been completed, the removal of the plate and the replacement of the flat cap on the holder enable effective flow of gas to be resumed to the meter and internal installation without the application of stress to the service pipe.

COMPRESSED ASBESTOS JOINTING

THE British Standards Institution has issued a further specifications in the series which is being prepared for the petroleum industry. This is B.S. 1832, 'Compressed asbestos jointing for the petroleum industry.' The standard covers two grades of compressed asbestos jointing from $\frac{1}{64}$ in. to $\frac{1}{4}$ in. in thickness. The two grades are Grade G for general low duty purposes such as marketing and transportation, and Grade H for higher duty purposes such as those involving contact with oil and mainly used in refinery applications.

The standard gives details of the physical characteristics of the jointing, together with limits for tensile strength and resistance to oil and water, ageing, cohesion and compression. A service test is provided for, and clauses cover sampling, marking, and inspection. Appendices give details of the tests as well as itemised drawings covering the apparatus to be used for the service test. Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 24, Victoria Street, London, S.W.1, price 2s. 6d., post free.

Boosters and Governing

By T. W. AIKEN and B. I. STONE,
Bryan Donkin Company, Ltd.

From a paper to the Eastern Junior Gas Association, March 19

THE term booster is a vague one but in the gas industry is generally considered to refer to a machine for moderate pressure raising. Perhaps the most general application of a booster is to raise the pressure on the inlet of a station governor, and the machine most suitable for this duty is the turbo type. This type of booster is ideal for handling large and small and variable volumes at low pressure differences. Its characteristic is such that the horsepower input varies somewhat as the gas output, and this makes a constant speed machine quite efficient when handling variable volumes.

A booster for the purpose mentioned should be arranged with an automatic by-pass which closes when the booster starts and opens when it stops, so allowing the holder pressure to be conveyed to the inlet of the station governor. This automatic by-pass valve can be of the flap type or can be diaphragm operated, but the installation of a self-acting by-pass of some kind is an essential safety factor.

A turbo booster can be direct coupled to a steam turbine or can be belt driven from a high speed steam engine. It is also very adaptable for electric motor drive, either direct coupled or through vee ropes.

In the absence of both steam and electric power, gas engine or oil engine drive is a practical proposition, either by vee belt or a combination of vee belt and gear box. There is no doubt that the oil engine is gaining favour, but a very big factor in favour of electric drive is that it is easy to start and stop the plant automatically according to the demands of load on the district, time of day, and position of the holder.

An up-to-date plant of this type would be arranged as follows:—

The volume would be equal to the maximum peak instant plus allowances for future development. The pressure difference would be such that the gas in the highest lift of the holder could be used for the peak load pressure, giving a pressure difference across the station governor of 2 in. W.G.

The drive would be by electric motor with automatic starter controlled by two switches: (a) a pressure switch; (b) a time switch. The pressure switch is operated by the holder pressure.

The time switch is set to close and open during any period, say, three times per day, 7.0 a.m. to 9 a.m., 11.0 a.m. to 1.0 p.m., and 5.0 p.m. to 7.0 p.m. During these periods, if the holder uncups, the pressure switch would start the booster. Either switch could be rendered inoperative and the plant run on a time or pressure basis. The plant could also be run on hand control or remote control.

Other recent developments enable the plant to be started up when the flow outlet of the station reaches a certain figure, thus ensuring adequate pressure at a terminal point.

All boosting plants pulling gas from gasholders should be equipped with a device to stop the plant when the holder reaches, say, two plates from empty. In the case of electric drives this takes the form of a holder-operated cut-off switch, over-riding all other switches.

For the schemes outlined above, the plants are fixed adjacent to the station governors, and there is no oscillation from this type of plant the whole unit can be arranged with the station governors in the same house.

With modern distribution systems, high pressure feeder mains, feeding to district governors, are common and the high cost of laying large mains is making this system more general. With such system, pressures of 20 in.—50 in. W.G. are usual, and as the boosters for these systems often run for long hours speed control is desirable for the purpose of power economy. When the volumes to be handled are high, speed control can readily be under the control of a governor operating on the prime mover and this can be remotely controlled from the inlet of the most distant district governor. This arrangement gives the greatest power economy.

For boosters intended for this purpose or for pumping from one station to another, the question of prime mover is important, and a standby plant with a different form of prime mover should be considered. If the boosting station is relying on electric power from the grid, consideration should be given to some form of standby drive. Diesel engines are quite suitable for this duty, and with this combination of drive the peak load pressures on the district would be independent of electrical cuts.

When assessing the relative costs of steam, electric, and oil engine drive, they must be considered in relation to power cost plus maintenance cost. For small plants the squirrel cage electric motor holds the field on account of its cheapness and robust simplicity. For large units, the variable speed A.C. commutator motor and also the D.C. motor fed from a mercury arc rectifier are making considerable headway on the grounds of overall efficiency.

Turbo boosters for large volumes are capable of giving pressures of 15 lb. per sq. in. and over, and with proper speed control, are efficient over a wide range of load.

Where the ratio of volume pressure is outside the range of turbo type plant, the rotary positive type machine is a highly efficient unit, and when used in conjunction with proper gas control gear it can be used for a wide range of duties. For pressures of 10 lb. per sq. in. and over, the vertical reciprocating compressor holds the field. It is adaptable to all the usual types of drive and can be fully automatic.

Back Pressure Problem

Back pressures on works are often undesirably high, and if gas is made into a light holder and then boosted into a heavy holder, in addition to assisting in the back pressure problem, more control over maintaining a steady C.V. in the gas supply is possible. Variations are ironed out in a small holder, and if this gas in bulk is delivered at a good velocity into a large holder the gas in the holder is well mixed.

Boosters for this purpose can be controlled automatically by the holder position—*i.e.*, the booster starting up when the holder is nearly full and shutting down when the holder falls to a predetermined level. This is assuming an electric drive. The control is achieved by holder-operated trip switches. A non-return valve on the outlet of the booster is necessary to prevent a backward flow when the booster is stopped. The other application is to reduce the back pressure on the outlet of purifiers and the holders. These boosters are usually operated to maintain a slight back pressure on the purifiers and can be controlled automatically by the pressure governing the speed of the prime mover or, in the case of constant speed electric motor drive, by arranging a pressure governor in the outlet stream from the booster, this governor being controlled by the inlet pressure.

The development of new areas to be supplied on the outskirts of a normal supply area presents a problem, and although the ideal solution would be to lay a new boosted pressure main, from works or holder station, the small amount of business obtained from these new areas often does not justify a high capital cost. One way of dealing with the problem is to install a small booster on the edge of the district to raise the pressure going forward to the more distant area. The application of this system is naturally limited by existing main sizes, but many installations are in existence with excellent results. District boosters of this type are also used on the edge of a district to feed into a distant district

holder. It is usual in such instances to arrange for both inlet and outlet pressure control, the former being necessary to ensure that the pressure on the district on the inlet to the booster is not drawn below a set figure.

To generalise briefly on the type of plant best suited to meet particular duties, the following few notes may be useful.

In the case of the turbo type the pressure, volume, and horse-power vary in accordance with approximate rules—*i.e.*:

Volume varies directly as the speed.

Pressure varies directly as the square of speed.

Horse-power varies directly as the cube of speed.

If, therefore, we know the characteristic at a given speed, we can easily calculate the characteristic at any other speed. A typical curve plotted for one speed shows a slight pressure rise from zero volume and then a fall as the volume increases. The horse-power rises continuously from zero volume to maximum volume. The peak of the efficiency curve should correspond with maximum volume. Applying these rules to the case of a station booster driven by a constant speed electric motor, supplying gas to the inlet of a station governor, we can see that the station governor controls the flow of gas and also the power consumed. The speed of the plant being constant, the pressure difference will be approximately constant within the designed volume range and consequently the horse-power will vary as the volume demanded by the station governor. If the flow is reduced, so is the horse-power and *vice-versa*. Under these conditions, it is quite out of order to have a by-pass in operation when the booster is running, as this would increase the volume passed and consequently the horse-power.

The maximum pressure difference given by a single stage turbo booster depends somewhat on the volume to be handled. For a volume of 10,000 cu.ft. per hour the maximum pressure difference would be round about 8 in. W.G., and for 1,000,000 cu.ft. per hour 120 in. W.G., assuming sp. gr. of 0.5.

The Roots and Connersville type rotary positive machines have a fixed displacement per revolution. Slip between outlet and inlet takes place through the working clearances, and this loss is approximately dependent on the square root of the pressure difference. Thus, at 30 in. W.G. pressure difference, the slip may be, say, 7% of the total. At 40 in. W.G. pressure difference, the slip would be twice that at 10 in. W.G. pressure difference. Slip is unaffected by speed. For medium pressures and driven by variable speed prime mover, the unit can be run exactly to suit the load, and a high degree of efficiency is obtained.

Reciprocating compressors are not subject to high losses through slip. The main loss is due to the re-expansion of compressed gas left in the clearance between pistons, cylinder heads, and valves. The higher the pressure, the greater is the re-expansion of the trapped H.P. gas, and the lower is the delivered volume. This type of machine covers a wide range of pressure and volume and is efficient over wide limits of load.

Small station governors are often direct loaded, but the addition of a relay simplifies pressure changing, and in the case of large governors the relay is advisable to avoid the handling of cumbersome weights.

With station governor installations, it is common practice to install a safety governor to feed gas direct from the make main to the inlet of the station governor to ensure limited supply on the district if all holder outlet valves are inadvertently simultaneously closed. An alternative safety arrangement is to install a pressure switch operating an audible alarm adjacent to the holder outlet valves. If the operator closes a valve which would shut off the supply, he receives audible warning while he is still operating the valve.

District Governors

District governors of the low pressure type can be direct operated or a relay can be incorporated. Clock control can be added to give additional pressure during periods of peak demand, or in the case of governors arranged to back up districts, to shut off completely at night.

In the case of high inlet pressure, it is preferable to use governors of the relay type, especially if the inlet pressures are high during periods of low demand. It should be the general practice with district governors with high inlet pressures to install an outlet pressure recorder. It is not uncommon to go to a works and see the station governor house, well built, with tiled walls; the governors well maintained, with inlet and outlet pressure recorders and gauges, with an attendant making frequent visits; and at the same undertaking, to find on the district a governor dealing with a high inlet pressure, housed in a wet underground pit probably half flooded, and the governor not well maintained, with no pressure indication on the outlet.

In the case of the station governor, the maximum pressure which could get on to the district would be the holder pressure, and this would be unlikely to cause damage, but in the case of the high pressure governor, the consequences could be serious.

Dust coming from mains is perhaps one of the greatest nuisances to be dealt with, and some form of dust trap will get over a lot of the difficulty, but even when a dust trap is fitted, district governors should be inspected and serviced regularly, including cleaning the dust trap.

A short description of the application of governors to control the flow of C.W.G. gas, together with safety devices, may be of interest. The exhauster installation consists of a steam-driven turbo exhauster having a capacity of 15 mill. cu.ft. per day, and three 5 mill. per day positive exhausters as standby. In all cases, there is an air blower for oxide revivification driven from the exhauster shaft.

Automatic control was considered necessary as the relief holder capacity is only one-quarter of the hourly manufacturing rate. The exhauster pumping rate is controlled by the holder position operating through a pneumatic relay, and is arranged to keep the holder in the mid position approximately. The air supplied to operate the relay is taken from the C.W.G. air blast main.

The holder is free to rise and fall sufficiently to cover the normal variations due to the intermittent flow of gas from the manufacturing plant. If there is a rise of mean manufacturing rate, this will cause the holder to rise and the holder-operated relay will increase the pumping rate. Conversely, if the manufacturing rate is reduced, the consequent fall in the holder position decreases the pumping rate.

The control operates on either the turbo exhauster or the three positive exhausters, the steam throttle valves of the latter being coupled together and operated simultaneously by one diaphragm controller. If the holder gets to the bottom limit position due to the cessation of gas manufacture, the exhausters are not stopped completely but 'tick-over,' and a pressure operated by-pass comes into action preventing a vacuum on the holder or manufacturing plant. This allows normal pumping to take place again as soon as gas manufacture is restarted. At the same time when this 'tick-over' position is reached, cut-off comes into operation to shut off the oxide revivification air. Normal air flow is restarted when gas-making is resumed.

On this installation, the air blower for oxide revivification is driven off the exhauster shaft, and as it is possible to run a turbo exhauster with both the inlet and outlet valves closed, it will be realised that, without safeguards, should the turbo exhauster be run under these conditions, air would be pumped into the gas mains. The safeguard consists of an air cut-off valve operated by a relay, controlled by two small tappet operated pilot valves, and these pilot valves are actuated by the main inlet and outlet valves of the turbo exhauster. The air blower for oxide revivification, which is driven from the exhauster shaft, is equipped with a volumetric governor so that the air rate, once set, remains constant.

When the lay-out of connections allows the installation of an orifice plate in the main gas flow, it is possible to control the air flow rate to maintain a fixed percentage—*i.e.*, as the gas flow changes, the air flow will change also to maintain the same air ratio.

COMPANY MEETING

Radiation Limited

Annual General Meeting: Speech of Harold Hartley, C.B.E., D.Sc. (Chairman)

AT the annual general meeting of Radiation Ltd., held at the Incorporated Accountants' Hall, London, W.C.2, on Thursday, April 3, 1952, the Chairman, Dr. Harold Hartley, C.B.E., said:

Before dealing with the accounts, I wish to refer to the death of Mr. J. F. Davies in August last. Mr. Davies had been associated with the gas appliance industry for 57 years. Some 28 years of his life had already been spent with John Wright & Co., Ltd., of which he was Managing Director, when Radiation Ltd. was formed in 1919. He was one of the original Managing Directors of the Group, and later became its Deputy Chairman. In 1941 he was elected Chairman, a position he held until his retirement at the end of 1948.

From its formation Mr. Davies played an outstanding part in the development of the Company. During the difficult war years he was able to guide its activities so that it emerged with its strength unimpaired. We who for so many years served under him, and later became his colleagues on the Board, are deeply conscious of the selflessness which characterised his actions, of the inspiration of his example and of the worth of his friendship. During his lifetime he played an important part in the expansion of the gas appliance industry and formed very many friends who, like us, honour him and deeply regret his passing.

Directors' Report

The accounts comprise the consolidated profit and loss account and the consolidated balance sheet of the Radiation Group and also the balance sheet of Radiation Ltd. as at December 31, 1951, with comparative figures for the preceding year.

The consolidated profit and loss account shows that the trading profit of the group for 1951 was £1,537,649 as compared with £1,536,225 for 1950. After adding income from investments and other income and providing for depreciation, directors' remuneration, audit fees and pension payments, the profit before taxation was £1,262,766, a decrease of £21,259 compared with the preceding year. The investment income of £58,672 was £6,005 higher than in 1950.

After reserving £768,897 for taxation but crediting the account with £39,889 provided in previous years in excess of liability, there remains the net profit of the Radiation Group of £533,758 compared with £559,650 in 1950. After providing £212,593 drawn by Radiation Ltd., the undistributed profits retained by the subsidiary companies amounted to £321,165. On adding to the former amount the sum of £166,197 brought forward from 1950 there was a balance of £378,790 available to Radiation Ltd.

The interim dividends already paid and the final dividends recommended for payment, will absorb £212,432 which leaves a balance of £166,358 to be carried forward in the accounts of Radiation Ltd., at December 31, 1951.

The aggregate balance standing to the credit of the profit and loss accounts of the subsidiary companies, after including the undistributed profits for 1951 of £321,165 totals £882,859. It is proposed to transfer out of this sum £100,000 to the stocks obsolescence reserve, £63,408 to the fixed assets replacement reserve and £25,000 to the pensions reserve. The balance to be carried forward to the consolidated balance sheet is, therefore, £860,809, including £166,358 for Radiation Ltd.

From the consolidated balance sheet it will be seen that the book value of the fixed assets is £2,164,327, an increase of £30,278 over the comparative figure for 1950. If the amount of £228,806, which has been written off for depreciation, is added to the above increase in the fixed assets, the resulting total of £259,084 represents the expenditure during 1951 on new buildings and plant.

The current assets of the Group, comprising stock, debtors, investments and cash, total £8,021,601 and after the deduction of current liabilities and provisions of £2,248,646, there is an excess of current assets over current liabilities and provisions at the end of the year of £5,772,955 compared with £5,475,915 at the end of the preceding year.

Capital Structure

For some time your Board had discussed with its auditors the advisability of adjusting the capital structure so as to make it more representative of the strength of the Group. Each year when addressing you I have referred to monies invested in developing the business, and last year attention was drawn to the fact that the total capital as represented by net assets exceeded £7,600,000. It was decided to approach the Capital Issues Committee for authority to capitalise a portion of the reserves and issue new ordinary shares. Official approval was granted and at the extraordinary general meeting held on November 27 last, the authority of the shareholders was obtained to make the necessary changes. The effect of these transactions is shown in the two balance sheets before you. The step has increased the stability and also the credit of the Group, since the accumulated reserves which have been capitalised can no longer be regarded as distributable income.

It was pointed out in the circular issued on November 5 last that it must not be assumed that the action taken in any way indicates that the total amount of the future annual distribution of dividend to the Ordinary stockholders is likely to increase beyond the amount distributed previously for each year. The primary object of the operation was to bring the issued capital into somewhat closer relationship with the actual amount invested or employed in the undertaking.

During the difficult times that are ahead your Board feels it to be essential that our reserves shall be conserved, and that an especially close watch shall be kept on all expenditure. The Board is gratified that the proposals were so strongly supported by the shareholders.

Investments

It will be seen from the consolidated balance sheet that the market value of the Company's investments was slightly lower than the book value at December 31, 1951. This has resulted from the recent fall in Stock Exchange quotations for gilt-edged securities. This difference of £37,958 is more than covered by the reserve for investments which appears on the opposite side of the balance sheet at £373,765. Practically all the investments are in British Government securities and in corporation stocks, of which a large proportion is short-dated.

Capital Expenditure

It has been mentioned already that the capital expenditure incurred during the year on new buildings and new plant amounts to £259,084. Whilst the bulk of this expenditure has been incurred at home, a portion is represented by expenditure of our New Zealand subsidiary. As with the group at home, so in the case of this subsidiary company, the direction in which development is to take place has been planned in broad outline. Capital expenditure is directed to ensure that the organisation there shall operate as an effective unit of the Group. It is intended that manufacture at home and abroad shall be adjusted so as to promote the best interests of the Group as a whole.

Research and Development

During the post-war period there has been a considerable increase both in the scope and scale of the central laboratory activities. During the current year the Section has benefited from organisational changes which were introduced in 1950. The development team system which was described in a communication to the Festival of Britain Design Congress has now been in operation for some time. As a result there is closer co-operation between the development, the production and the sales personnel of the organisation in the preparation of new designs.

In view of the problems with which the gas industry is faced in maintaining supplies of gaseous fuel, it has been necessary to give thought to the possibility of increasing the flexibility of appliances so that satisfactory performance will be attained, even if appreciable changes in gas quality have to be

(*Continued on p. 113.*)

made. Work on these problems has been increased, and the combustion laboratory has been re-equipped and reorganised. A new laboratory has also been installed at the Wembley works for use in this connection.

More work has been done in the application of functional research to the design of domestic appliances. Difficulty has been experienced in recruiting the staff needed for the extension of background research, and there is still a national shortage of competent young men with a scientific training. This is due in part to the growing demand for scientists made by Government departments and by industry generally, and in part to the fascination of nuclear research. There is a lack of appreciation of the opportunities offered by well-established industries with a progressive outlook.

Output

During the year under review the works committee of the Board has acted energetically in securing our quota of the supplies of raw materials available and in seeing that these are adequately distributed throughout the organisation. It has also improved still further the liaison between the production units. It has the responsibility of advising the Board of the steps required to ensure that the plant and production methods employed are kept up to date, and to see that the productivity of the various units is adjusted to enable the organisation to meet in the most effective way the demands from the industries with which we co-operate at home and abroad.

The output of products, as well as their monetary value, increased during the year despite the shortage of raw materials which existed; in certain spheres of activity an appreciable increase in output was obtained. The financial value of the turnover showed an overall increase of some 9%.

During the last few months production difficulties have increased noticeably. It is our lot to live in difficult times, and it is the responsibility of all of us to apply our best endeavour to promote the welfare of the country.

The outlook is not bright, but where there are difficulties they must be overcome. Your Company has an important part to play in assisting the well-being of the industries with which it is connected, and your Board intends that part shall be played.

Cost and Prices

Last year attention was drawn to the increases which were taking place in the costs of production, and special reference was made to the low-price cookers. During the past year there has been further monetary inflation and all costs have risen sharply. As it was no longer possible to expand the output so as to counteract the effect of these steadily rising costs, it was decided regretfully as from October 1 last, that an increase in price would have to be made. Had your Board given less consideration to the national needs, prices would have been increased at an earlier date; such an increase would have been accepted by our customers as justified. Your Board is conscious of the need always to supply the best quality products at the lowest possible prices, and feels that the efforts made by the organisation are proving successful.

Profits and their Allocation

From the consolidated profit and loss account it will be seen that although the trading profit was a little higher, the net profit of the Group was nearly £26,000 lower than that recorded a year ago. The heavy provision which has been made for taxation will have been noted. The need for this arises from the increase in the rates of income tax and profits tax payable on the profits for the year as well as the additional amount payable for income tax on the profits of the year 1950, due to the higher rate of tax now levied. Last year the sum reserved for the payment of income tax and profits tax amounted to £724,375. This year the reserve which has to be made amounts to £768,897, but as the sum provided in respect of earlier years was £39,889 in excess of the amount needed, the charge in the present accounts is reduced to £729,008.

Until the new profits levy and the changes in profits tax have been more fully explained in the Finance Bill, it is not possible to do more than form a rough estimate of their effect. In the absence of provisions for adjustment it seems that the average of the three base years 1947-49 may form for us a disappointing standard for purposes of excess profits levy. It was not until 1949 and after that it was possible to make effective the reorganisation and re-equipment of the main production centres.

This year there has been retained by the subsidiary companies and the parent Company the sum of £321,326 as compared with £337,100 a year ago. The capital expenditure already referred to of £259,084 compares with a capital expenditure of £246,854 in the previous year. The dividend which your Board proposes should be distributed represents for the 11,000 shareholders the net amount of £212,432 which compares with £222,550 distributed for 1950.

Group Sales

The unification of the selling arrangements which has followed the formation of Radiation Group Sales, Ltd., has been amply justified by the results.

The activities of the gas division are concerned principally with the nationalised gas industry, and the outstanding problem of the year has been the equitable allocation of the production. The home market demand for domestic appliances far exceeds the quantity that can be manufactured with the materials available—this applies particularly in the case of the low-price cooker made at Warrington.

The demand for large cooking equipment for institutions and industrial canteens has also been in excess of the year's output. During the last few years a considerable amount of research and development work has been carried out to allow of the manufacture of apparatus designed for use with other gaseous fuels. Last year there was a considerable growth in the demand for these Radiation appliances, and it is anticipated there will be an appreciable expansion of our activities in this field.

Solid Fuel Division. The year's operations show something of the benefits which are resulting from the reorganisation referred to last year. Increased sales were called for and a very gratifying increase in output was effected. Had it been possible to expand production still further, the Group sales organisation would have been able to dispose of the output. Unless restrictions are imposed from outside, a steady expansion of the activities of this solid fuel section of the organisation can be anticipated as the full advantages of specialisation are attained.

Export Division. Last year it was possible to record an increase in exports of 10% over the preceding year. This year there has been a further increase of 30%. During the last three months of 1951 the deliveries showed an increase of 50% as compared with the corresponding period of 1950.

The goods exported cover a wide range of our manufactures, and models especially suitable for export have been designed. It is essential that we increase the output for that field. Last year the full satisfaction of the encouraging demands for our products in the overseas markets was in part hampered by a shortage of raw materials, and in part by our inability to obtain the shipping space for all the goods prepared for despatch abroad.

Raw Materials Allocation

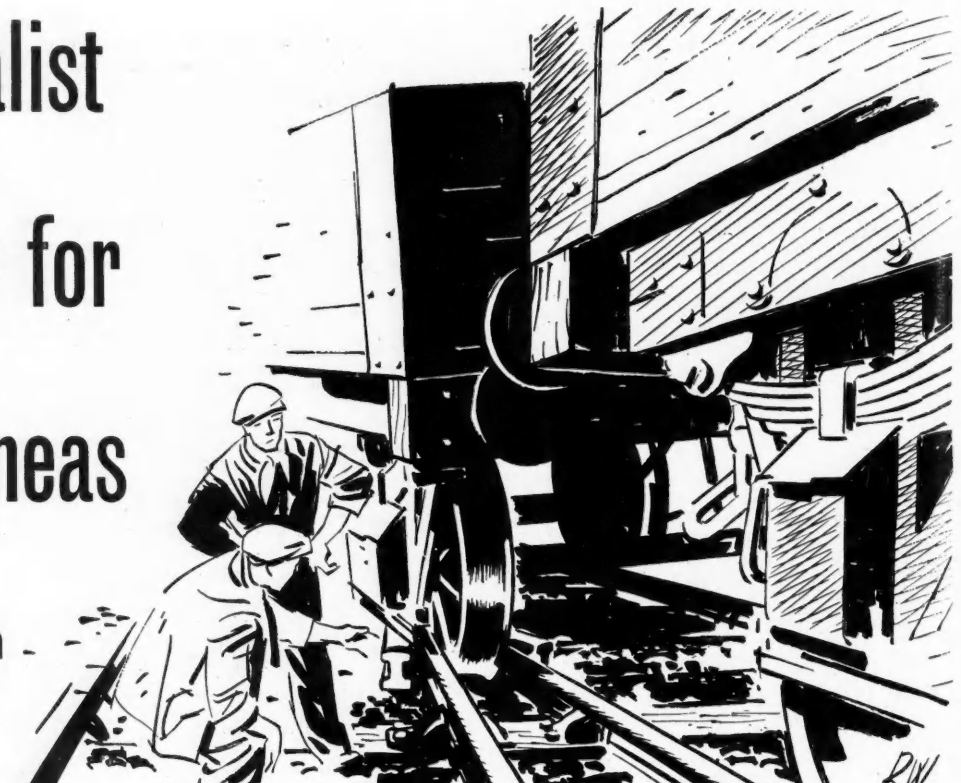
Special allocations of raw materials which are made for export orders are a great help in promoting the expansion of overseas markets without our having to penalise production for the nationalised industries at home. It is vital owing to the needs of the country that exports shall be cleared quickly, and it is hoped that steps can be taken without delay to see that hindrances which arise from conditions at home shall be minimised. Much will then depend on the continued ability of dominion and foreign Governments to accept imports from this country.

In view of the importance of our interests in Australia and New Zealand, I have spent some months in these Dominions since last addressing you. A principal object of the visit was to co-ordinate our activities in each of the Dominions, and to arrange matters so that the trade of the Group shall be less influenced by changes which are imposed owing to economic difficulties, experienced either in our own country or abroad. Discussions with Ministers and leaders of industry were helpful in assessing the situation.

When in Australasia it was gratifying to find that the Radiation products are regarded as pre-eminent, and to learn of the appreciation in these Dominions of the part played by our organisation in helping in the expansion of the gas industry in the sphere of utilisation, and of the good effects of our policy of specialisation in production. The work done by our research and development staffs was also highly praised. Mr. W. D. King is at present in South Africa, and we are hopeful that his visit will produce good results if trade can be continued freely with the Dominion.

(*Continued on p. 115.*)

Specialist advice for 10 guineas a year will



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The number of derailments every month amounts to a formidable figure, and their cost is a serious addition to normal traffic budgets.

Most derailments are avoidable, and are caused by wear, poor design, inefficient manufacture, slipshod installation, or plain lack of maintenance. The latter is their most frequent cause ; for instance, a worn tongue rail, loose fishplates, a lever box that leaves switches at half-cock, inadequately packed sleepers, or loss of alignment in the track. Any of these conditions will cause a derailment.

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A Print for Industry Ltd., Advertisement

RADIATION MEETING—

The need for increased exports has been stressed by the present Chancellor of the Exchequer, as it was by his predecessors, and it is hoped the Government can help further to render it possible for goods to be acceptable when manufacturers are able to secure markets. In view of the cost of transport and of the effects of tariffs and other charges, the landed cost is very much higher than our home cost, and selling prices are affected accordingly. Low costs of production are so often a *sine qua non* in endeavouring to establish an export business, that any overall decrease in raw material allocation, which must affect costs adversely, will make it the more difficult to increase exports. Of immediate importance is the need to find solutions to the financial problems involved in international trade, and especially those which affect trade within the Commonwealth.

General Organisation

Headquarters. During the year the head offices of the Group were transferred from Birmingham to No. 7, Stratford Place, London, W.1. Additional accommodation is provided in the adjoining building, No. 8, Stratford Place, which was acquired in 1946 in anticipation of this move. The centralisation of head office departments with the showrooms available for the display of Radiation products will enable us to give still better service to our customers.

Reorganisation. In past years especial consideration has been given to development, production and sales, and our present concern is with general administration. It is necessary from time to time to review critically methods of operation even when they have proved effective in the past, so as to ensure that if they have not now become obsolete, at least they are not hampering progress. The co-ordination of effort within the Group has been continued during the year, and steady progress is being made. Also it is our object to try and ensure that the sense of unity which exists in the individual members of the Group shall apply to the Group as a whole.

We are very appreciative of the degree of co-operation which exists throughout the organisation and of the spirit which animates our relations with the different sections of the Group. We receive generous and valuable support from our fellow employees, and this the members of your Board find a great help. It is their wish, and I am sure it will be yours, as representing the stockholders, that this be acknowledged gratefully.

The report and accounts were adopted and the dividends, as recommended, were approved.

Hotelympia.—We are asked to state that the Newcastle hotel and catering exhibition reported in the *Journal* of March 26 was not a repetition of Hotelympia, nor was it held in conjunction with or under the auspices of the one and only Hotelympia—the National Hotel, Restaurant, and Catering Exhibition held biennially at Olympia.

COMPANY NEWS

THOMAS DE LA RUE

The resolution approving the capitalisation of £463,000 of reserves was duly passed at the meeting of Thomas De La Rue on March 26.

WHESSOE

The Directors of Whessoe, Ltd., are making an issue of 400,000 5s. ordinary shares at 15s. each by way of 'rights' to existing holders in the proportion of one new share for every five held.

MARYBOROUGH

The directors of the Maryborough (Queensland) Gas and Coke Co., Ltd., in their report for the year ended December 31, 1951, state that sales of gas and residuals show a considerable increase as compared with 1950, but, against this, expenditure also shows a substantial increase due principally to several increase in wages, coal, etc., during the past 12 months. Sales of gas appliances during the 12 months created a record. The paid-up capital of the Company was increased during the past year by the sale of 33,000 new shares of £1 each.

The profits after writing off £1,100 for depreciation, transferring £700 to reserve fund, £400 to reserve for plant renewals and contingencies amount to £4,905 (£3,216). Adding the amount brought forward from last year, £1,023 (£869), less provision for taxation, £2,000 (£1,000), and for employees' retiring allowance £250, there is a balance at credit of profit and loss appropriation account of £3,678 (£3,085). The directors recommend payment of a dividend of 5%, which will absorb £3,005 (£2,062), leaving a balance to be carried forward of £673.

STEWARTS & LLOYDS

A group profit of £8,000,253 for the nine months to September 29, 1951, is reported by Stewarts and Lloyds, compared with £8,648,662 for the full year 1950. The output of all the company's products was higher in the year 1951 than in 1950, the increase in the case of steel tubes being approximately 9%. The Directors recommend payment of dividends to the Iron and Steel Corporation for the period February 15, 1951, to September 29, 1951, on the preference and 12½% per annum on deferred. On May 29, 1951, a dividend of 12½% per annum on deferred (including liaison deferred) and dividends on preference stocks were paid for the period January 1, 1951, to February 14, 1951, to former stockholders.

General reserve has been increased by (1) £2,416,593 profit unappropriated December, 1950, (2) £716,207 profit, less dividends, for period to February 14, 1951, and (3) £517,200 debenture reserve no longer required following repayment in full of stock outstanding on September 20, 1951. The assets total is up by £4,244,869 at £57,627,884. Current assets include stock, debts and cash aggregating £31,778,643 (£29,856,794). Group capital commitments amount to £5,400,000.

GAS PURIFICATION

Dividend of 8% for the year 1951 (last year dividend 8% and bonus 2%). Net trading profit £17,794 (£17,313) including approximately £2,500 (£13,000) due to realisation of reserves in oxide on loan account. Net profit after tax is £6,115 (£6,798).

AUCKLAND

The Directors' report of the Auckland (N.Z.) Gas Company presented at the 90th annual meeting on February 25, showed that the balance at credit of profit and loss after deducting the dividend paid in February, 1951, was £15,723. The profit for the year ended December 31, 1951, after deducting working expenses, rates and land tax, depreciation, income tax and social security taxes, and other charges, was £1,049, making a balance to deal with of £16,772. The Directors' recommended a dividend of 2½% for the year ended December 31, 1951, leaving to be carried forward the sum of £3,463 5s. 8d.

SIDNEY FLAVEL

Applications are invited for a new issue of 1,000,000 ordinary shares of 4s. each at par, which has been underwritten by the Whitehead Industrial Trust, Ltd. In the absence of unforeseen circumstances the Directors contemplate dividends for the current year aggregating 11¼% (actual, less tax), which will thus be the yield on the new issue at the purchase price. The issue will rank *pari passu* with the 1,200,000 existing ordinary shares; there is no preference capital, but the Company has outstanding a mortgage to secure the principal sum of £50,000 and bank overdrafts (including subsidiaries) totalling about £160,000. The objects of the new issue are partly to reduce these overdrafts and partly to provide for the cost of building a new factory at Leamington Spa. Applications from existing shareholders will have preferential consideration.

NEWTON CHAMBERS

Newton Chambers & Co., Ltd., announce a larger distribution, on increased capital, a scrip bonus and bigger profits in their preliminary statement for the year ended December 31, 1951. A final dividend of 12½% (same), plus a cash bonus of 5% (nil) is recommended, making a total of 25%, payable on both the ordinary and preference shares which compares with a total of 20%, less tax, for 1950. Gross profit for the year rose from £394,235 to £577,292 and net profit from £147,574 to £216,078.

The directors propose to capitalise £50,000 of reserves to be distributed to preference and ordinary shareholders in proportion to their holdings on April 24, 1952. These new shares will not participate in the final dividend for 1951, but will rank *pari passu* thereafter. Last year a similar distribution was made. Present authorised and issued capital is £700,000, divided into £146,960 in 6% cumulative participating preference and £553,040 in ordinary, both of £1 denomination.